

Walk Around

US Tank Destroyers



Don Greer



Armor Walk Around Number 3
squadron/signal publications

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By Jim Mesko

Color by Don Greer

Illustrated by Darren Glenn and Dave Gebhardt



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Introduction

The tank destroyer came into existence in the US Army following the stunning German defeat of the French and British armies in 1940. The tank destroyer force was seen as a defensive counter to the German armored divisions. This concept was tested with favorable results during various war games in 1941. Mobility was stressed to cope with fluid battlefield conditions. Anti-tank guns were initially mounted on trucks and half-tracks, but it was soon realized that only a fully tracked vehicle would ensure the needed mobility. Over the course of the tank destroyers' evolution, it was decided that it was their job to destroy enemy armor, while tanks were to exploit breakthroughs in the enemy lines. This led to the doctrine of the tank destroyers being more heavily armed than tanks, but more lightly armored to give them better mobility and allow them to rely on stealth and speed in dealing with enemy tanks. Additionally, the tank destroyers were open topped to reduce weight and give the crews better visibility. While this feature accomplished its objective, it also exposed the crews to enemy fire; eventually, some effort was made both officially and unofficially to provide overhead protection.

The primary US tank destroyers during World War Two were the **M10**, **M36**, and **M18**. The M10 and M36 were based on the chassis of the M4 Sherman series. The M10 employed the M4A2 chassis and power train, while the **M10A1** was based on the M4A3 chassis. Both vehicles carried a 3-inch (76mm) gun. Over the course of the war, newer German tanks such as the Tiger I and II and Panther were introduced with thicker armor protection. The situation had become critical by late 1944 and a 90mm gun was fitted to a new turret mounted on the M10A1 chassis, resulting in the M36. The need was so critical for the 90mm gun that a small number of 90mm gun turrets were fitted to M4A3 Sherman hulls under the designation **M36B1**. Late production M36s were fitted with overhead protection and a muzzle brake later in the war and were designated the **M36B2**.

The final American tank destroyer was the M18, which had the distinction of being designed from the start for the tank destroyer role. It was fitted with a torsion bar suspension and equipped with a 76mm gun. The M18 was the fastest armored fighting vehicle of the war, due to its light weight and powerful engine.

While the tank destroyers performed valuable services during the war, their concept was flawed. The idea of a separate tank destroyer force was discarded soon after the conflict and their job assigned to regular tanks. Many M36s and M18s were provided to US allies under the Military Assistance Program (MAP). Surplus M10s also saw service in small numbers during the fighting in the Middle East. Some specialized vehicles, such as the Ontos and M56, were designed during the 1950s to provide mobile anti-tank capabilities, but these vehicles never saw service on the scale achieved by the tank destroyer force in World War Two.

Acknowledgements:

This book would have not been possible without the immense help and support of a lot of people. First and foremost, a special thanks goes out to Henry Venetta, Owner/Curator and Joe Plaisted, Assistant Curator of the World War II Vehicle Museum and Learning Center in Hubbard, Ohio. This is an outstanding museum dedicated to World War II vehicles, equipment, and uniforms. The staff is one of the most knowledgeable museum groups it has ever been my pleasure to deal with. Without their help I could not have completed this work. The staff of the Patton Armor Museum, Fort Knox, Kentucky has also extended every courtesy possible regarding their photo archives and vehicles. Numerous individuals have also provided support. Brent Mullins allowed me to use photos of his beautifully restored M18, which provided much needed details of the turret and drivers' compartment. Mike Green came through with select interior photos from the magnificent collection of Jacque Littlefield. A special thanks is also due to Richard Hunnicutt who has helped with so many projects over the years. A true scholar and gentleman, he is indeed the "Dean of American Armor History." Many of the photos shown here are the result of the fine photo work of my best friend, Duane Ward, who over the years has learned more about tanks than any aircraft enthusiast ever thought he would. Together, we have climbed over more tanks and done more contortions and balancing acts getting the various photos than we would like to think about. Finally, to my wonderful wife, Pat, who thankfully dragged me kicking and screaming into the computer era. Her support and assistance helped make this book a reality. To all these people – THANK YOU!

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Dedication:

To John Collett, USAAF; Jim Twigg, USMC; Leevon Marshall, USA; Scot Sexton, USA; and Josh Vandygriff, USA, who answered their country's call for brave men when danger threatened America. To them and all the men and women of our armed forces, this book is humbly dedicated.

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(Front Cover) This snow camouflaged M10 was assigned to the 773rd Tank Destroyer Battalion (TD Btn.) while on the outskirts of Benonchamps, Belgium in late January of 1945. The 773rd was one of the highest scoring tank destroyer battalions in the European Theatre of Operations (ETO) and this M10 was credited with destroying five counterattacking German tanks near Oberwampach, Luxembourg during the Battle of the Bulge.

(Previous Page) This M10 on outside display at the Patton Armor Museum at Fort Knox, Kentucky lacks nearly all of its external fittings. The front of the 1.5-inch (3.8 cm) thick hull armor was inclined at 55° for improved protection.

(Back Cover) An M10 of the 601st TD Btn. is dug in at the Anzio, Italy Beachhead in May of 1944. This Battalion was attached to the 3rd Infantry Division during the fierce fighting for the beachhead that spring. It has a camouflage pattern of Earth Yellow over the basic Olive Drab base color.

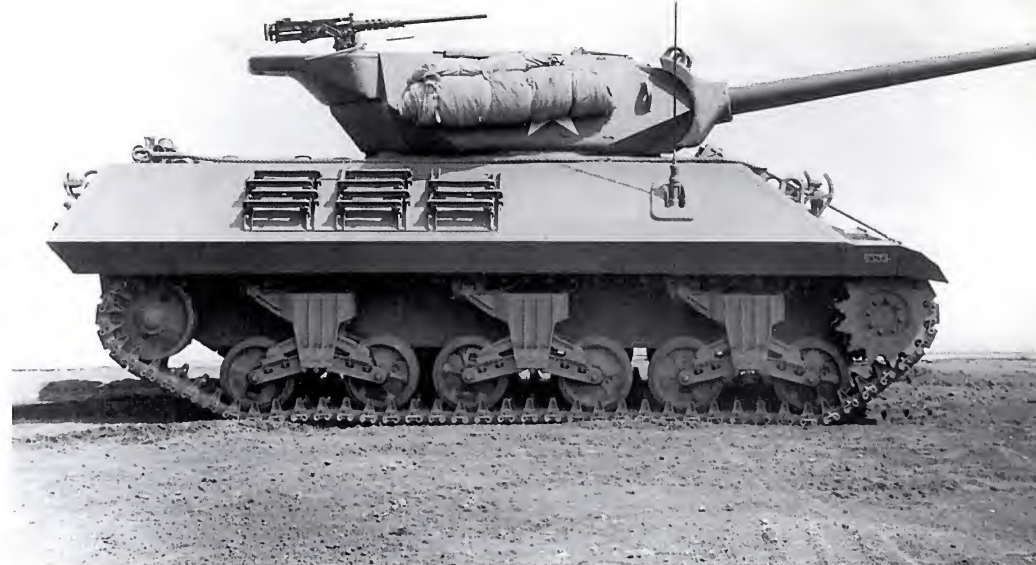


The M10 Gun Motor Carriage (GMC) was the first fully tracked American tank destroyer put into production during World War Two. It was armed with a turret-mounted 3-inch (76mm) gun and used the chassis of the M4A2 Sherman medium tank. This vehicle is fitted with the prewar design T41 rubber block track. (PAM)

The M36 was basically an upgunned M10A1 featuring a new turret and 90mm gun. Due to a shortage of M10A1 hulls, 187 M4A3 Sherman tank hulls were converted to tank destroyers under the designation M36B1. (PAM)



The M36B1 combined an M4A3 tank hull with the M36 turret. The only major modification was to rework the internal ammunition storage to accommodate the longer length and larger diameter of the 90mm rounds. Most of the original M36B1s were not fitted with the muzzle brake seen on this vehicle. The X-frame over the turret is for a foul weather tarp. (PAM)



The M10A1 was similar to the M10, but was based on the later M4A3 chassis. The main difference between the M10 and the M10A1 was the rear engine deck – the M10A1 featured the M4A3's wider engine access grill. This vehicle has the late style turret counterweight, sometimes referred to as the 'duck-bill.' (Hunnicuttt)

The M18 Hellcat was the only American tracked vehicle designed from the beginning for the tank destroyer role. It mounted a 76mm gun and featured a torsion bar suspension. The wartime version used a 31-tooth drive sprocket and employed T69 single pin steel track. The bulge on the turret side accommodated the 76mm gun mount. This bulge was eliminated in production models when the mount was moved off-center. (Hunnicuttt)



M10 Tank Destroyer



The M10's rear hull was set at a 38° angle and its armor was 0.75 inches thick. Wedge-shaped counter weights at the rear of the turret were used to balance the heavy gun barrel. This was the most common type of counterweight used on the M10 series. This vehicle is fitted with the T48 rubber block track with the wide chevron grouser – the most common type used in the war.

(Upper Left) The M10/M36 series was characterized by sloping armor to increase the protection provided by its thin armor. The 0.75 inch (1.9 cm) hull side armor was inclined at 38°, while the 1-inch (2.5 cm) turret armor was set at 15°. The basic M10/M36 and M18 were not fitted with a hull machine gun except for the M36B1, which was based on the M4A3 Sherman tank hull.

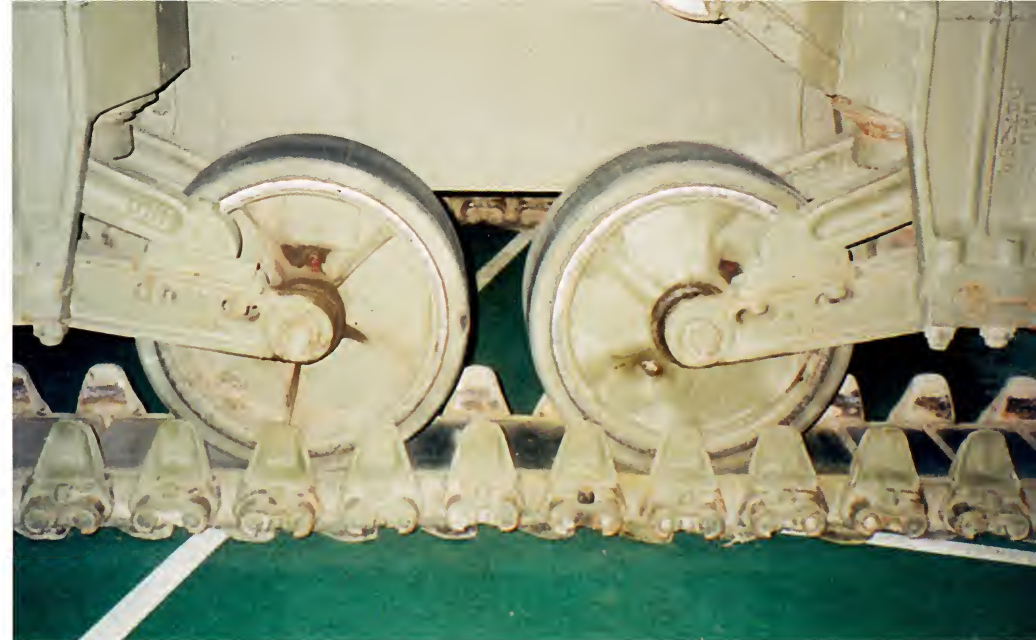
The sides of the M10/M36 were nearly identical with only minor differences in racks and stowage. This M10 on display in front of the Patton Armor Museum at Fort Knox, Kentucky has had its antenna mount plated over just forward of the hull star. The M10 and other US tank destroyers were painted overall Olive Drab (FS34087) at the factory and used this basic scheme throughout their US Army service career. Markings – including the five-pointed star national insignia – were Flat White. The steel tracks and rubber track shoes and wheel tires were left unpainted.





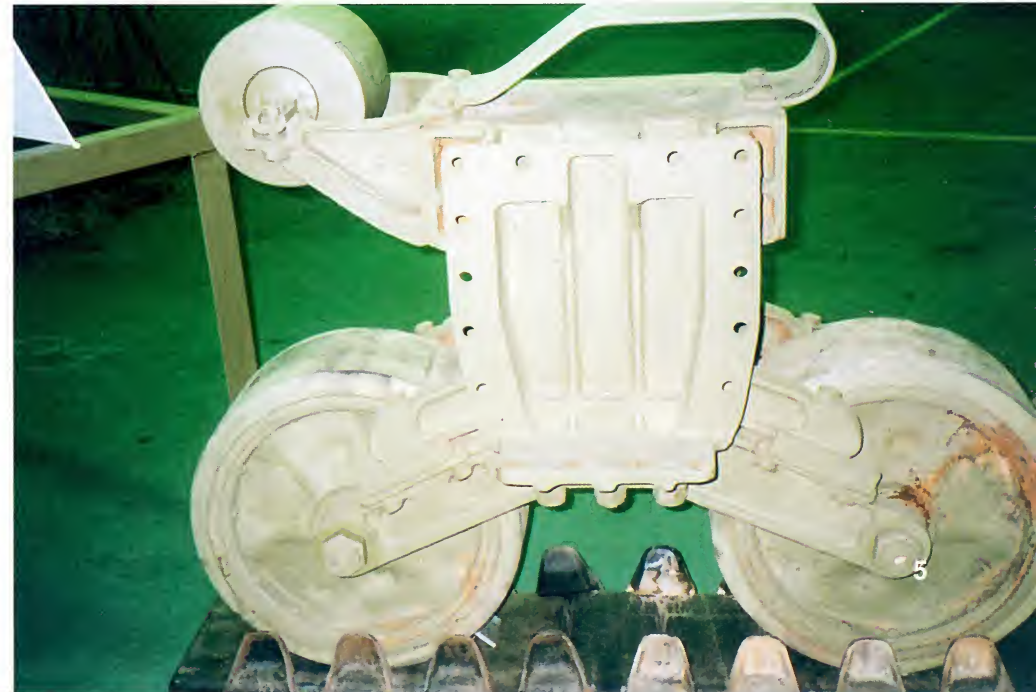
The M10/M36 used a Vertical Volute Spring Suspension (VVSS) unit. This was composed of two bogie wheels, suspension arms, volute springs, suspension bracket, and a return roller and track support arm. There were a number of versions of this unit with only minor differences. These are two of the more common road wheels – the early open spoked cast wheel (left) and the later solid stamped wheel with embossed spokes. (Ward)

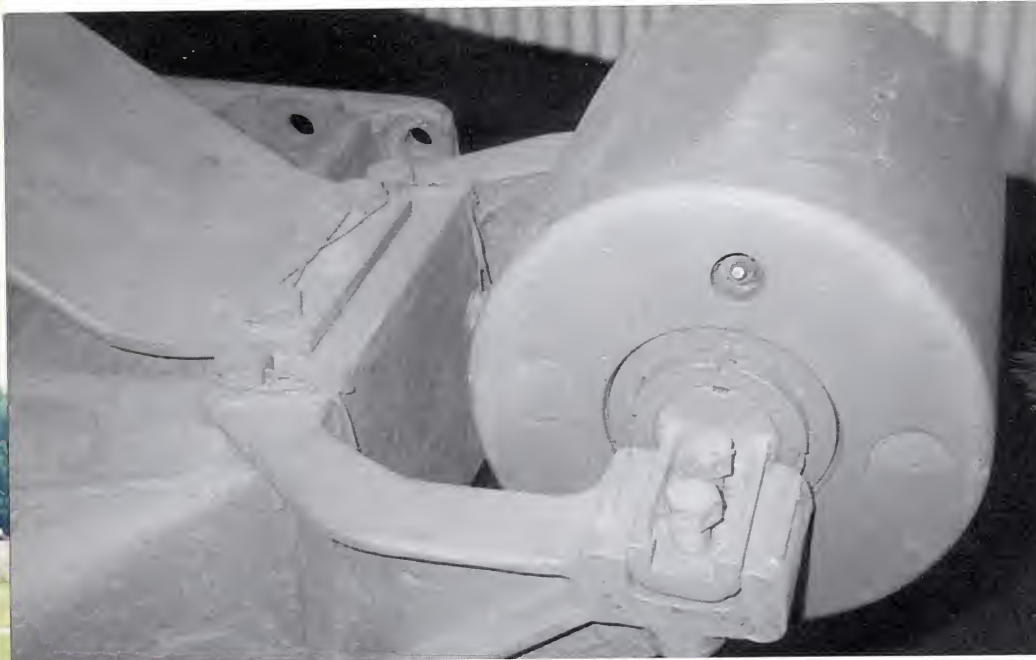
Late production vehicles used the smooth dish road wheel, which was the final bogie type employed on M10s/M36s. All variants employed a solid rubber tire bonded to the steel rim. Additionally, each wheel had a pair of grease nipples for lubricating the wheel bearings.



The spoked version also came with the holes plated over to prevent enemy soldiers or debris from jamming the wheels. This was an interim measure and was relatively rare.

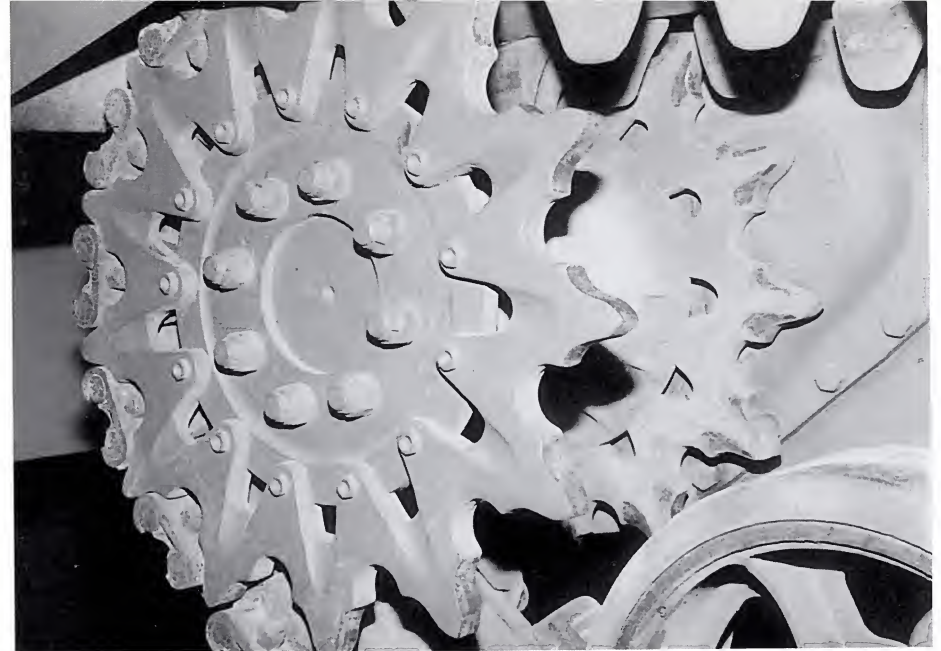
The VVSS unit was attached to the hull by 12 bolts and had a supporting bracket on the bottom. The return roller and track support arm could be mounted in either direction, which allowed the VVSS unit to be used on both hull sides. This simplified maintenance and supply problems and allowed the maximum number of serviceable vehicles in the field. (Ward)





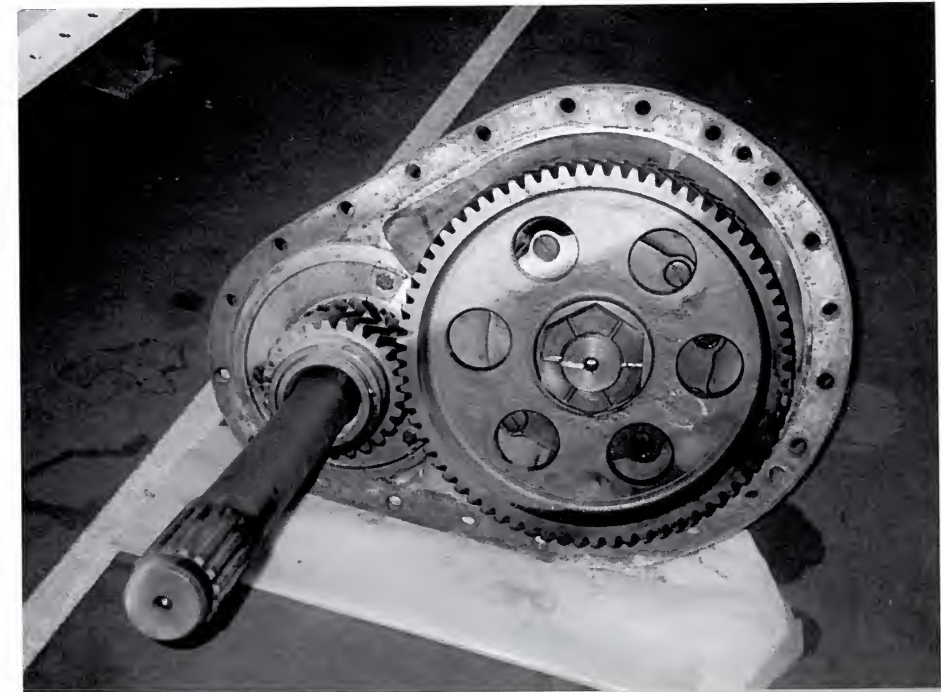
The return roller kept the track aligned and decreased the possibility of shedding it during a tight turn – as long as the track tension was kept properly adjusted. The metal track return roller was also equipped with a grease nipple for lubrication. Wire threaded through and around the bolts kept them from coming loose. (Ward)

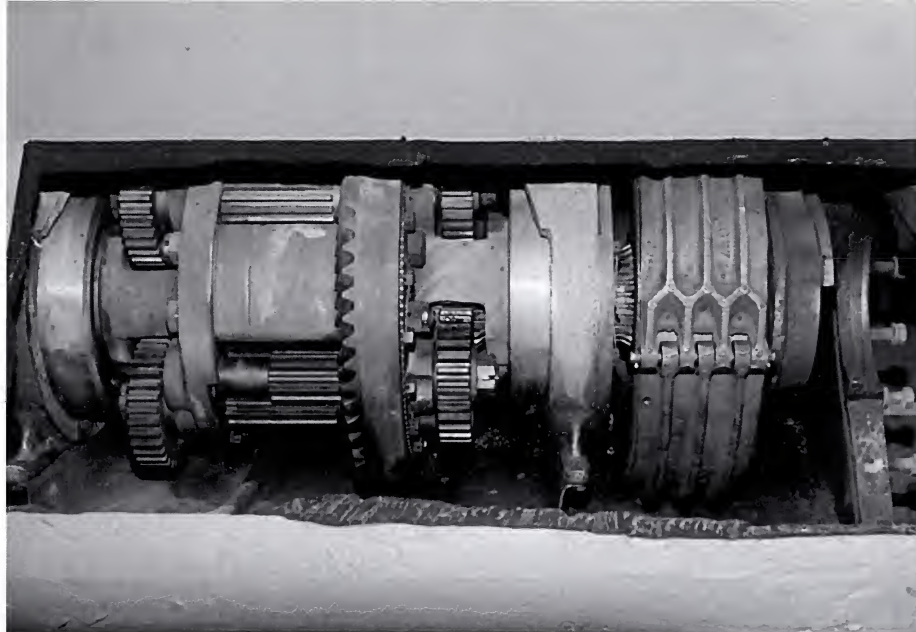
The drive sprockets were attached to the axle by eight bolts. This unit was housed in the final drive reduction assembly, which was bolted onto the forward hull sides. (Ward)



Two drive sprockets mounted on the front of the chassis drove the tracks. Each sprocket had 13 teeth for engaging the spaces between the end connectors. There were a number of sprocket variants, but these only differed in relatively minor ways. (Ward)

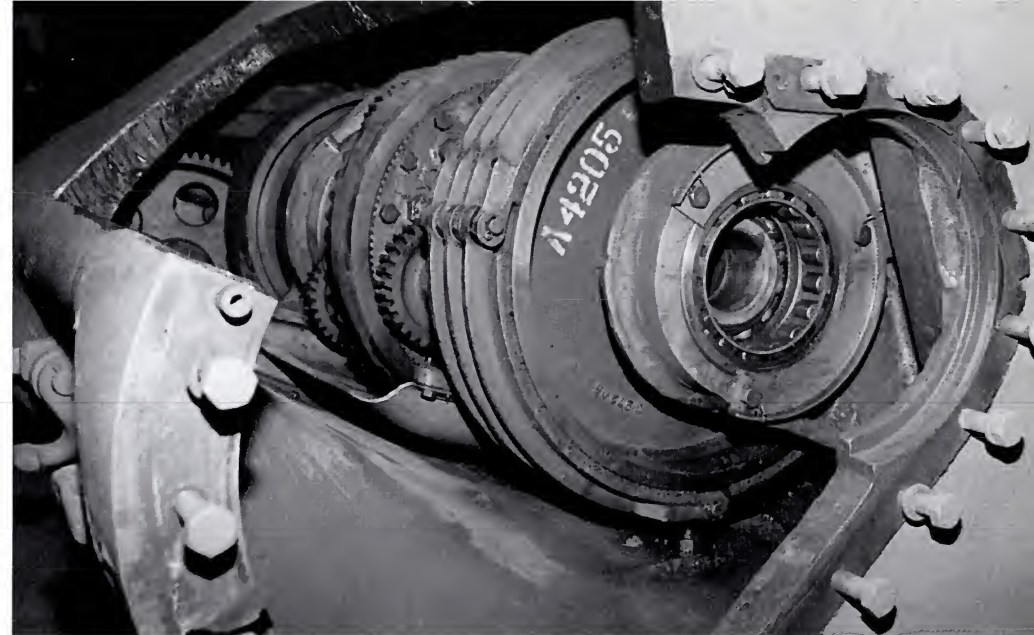
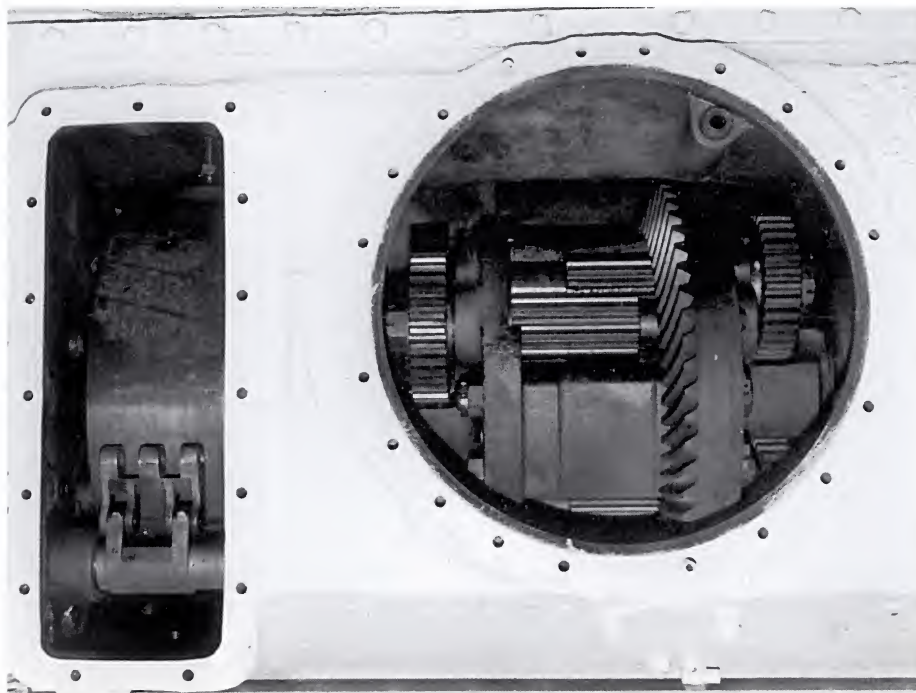
Access to the final drive unit was provided via a removable armored cover. The reduction shaft is seated within the synchromesh transmission. This shaft and gear turned the larger gear, which turned the drive sprocket. (Ward)





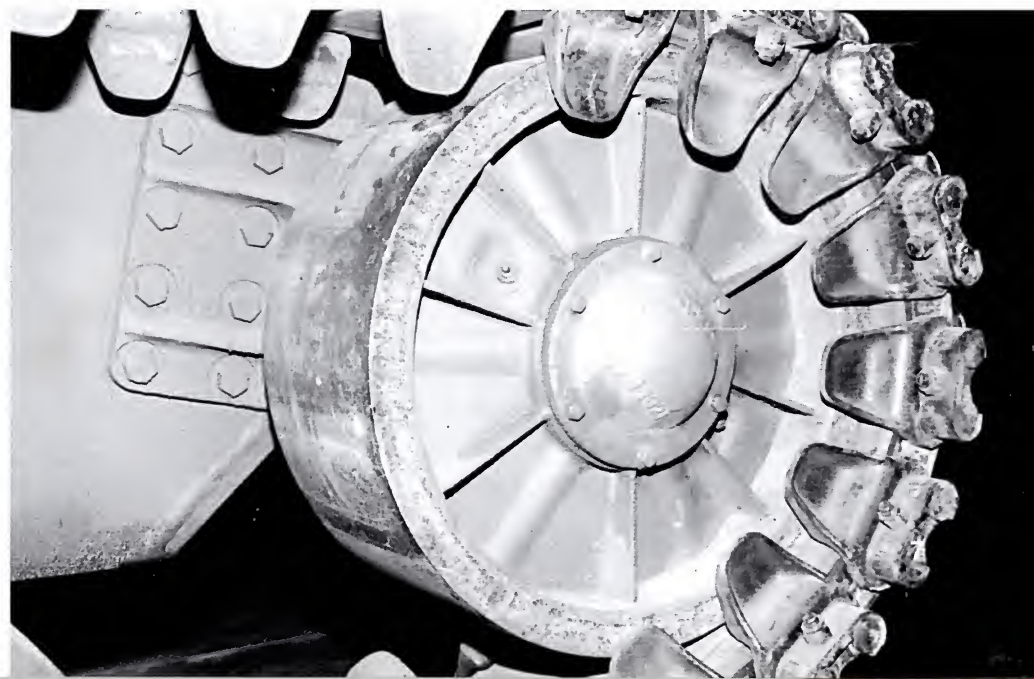
This cut-away display at the World War II Vehicle Museum and Learning Center in Hubbard, Ohio shows the planetary gear mechanism covered by the transmission cover. The synchromesh transmission had five forward and one reverse speeds. The steering brake is on the extreme right. When pulled tight, the brake slowed or stopped the track and made the vehicle pivot to turn. (Ward)

Some access to the transmission was also provided from inside the vehicle. The steering brake cover was removed from the rectangular slot. (Ward)



Both the M10 and M36 used the same transmission, which – in turn – was borrowed from the M4 Sherman series tanks. The reduction shaft's insertion point was located on the port side, with the various mechanism gears behind this point. (Ward)

The adjustable idler wheel was mounted at the rear and kept tension on the track. Unlike German tracks, the M10/M36 track had little play. Like the bogie wheels, the idler wheels were made in open spoked, stamped steel, and solid dish variants. The idler wheels were all steel and equipped with grease nipples. (Ward)





The idler arm was bolted to the side and rear lower hull. Track tension was increased or decreased at the oval fitting, which was located at the contact point with the idler wheel. (Ward)

This M10 at the Patton Museum shows the vehicle's general layout. The driver (port) and co-driver (starboard) were situated in the front hull, with the remainder of the crew located in the open top turret. Racks on the hull front and sides held extra track links and grousers. Missing from the side are the appliqué armor attachments lugs and bolts. These were commonly seen on both the early M10 and M36 hulls and are still fitted to this vehicle's turret. (Ward)



Turning the large nut at the end of the housing altered track tension. This caused the oval-shaped fitting to move the wheel forward to reduce tension or aft to increase tension. The cotter pin at the bottom kept the unit from shifting. (Ward)

Tool storage points are mounted on the engine deck along with the small set of engine access grills. Numerous fuel filler caps are located on either side of the grills. A gun travel rest is mounted on the aft engine deck (foreground). The gun turret was turned fully aft and the gun lowered onto this rest to reduce stress on the gun mount during extended travel. (Ward)





The M10 featured a one-piece transmission cover. It was never fitted with the early three-piece cover seen on early M3s and M4s. The U-shaped crew step is mounted in the center of the transmission cover. Towing points are located on either side of this step. The extra track stowage was not a common feature in this position. (Ward)

Lifting rings were welded on either side of the front hull. They had a roughcast appearance and prominent weld seams. An appliqué armor-mounting lug is located just above and to starboard of the ring. The weld seam joining the front and side armor plates runs diagonally under the ring.



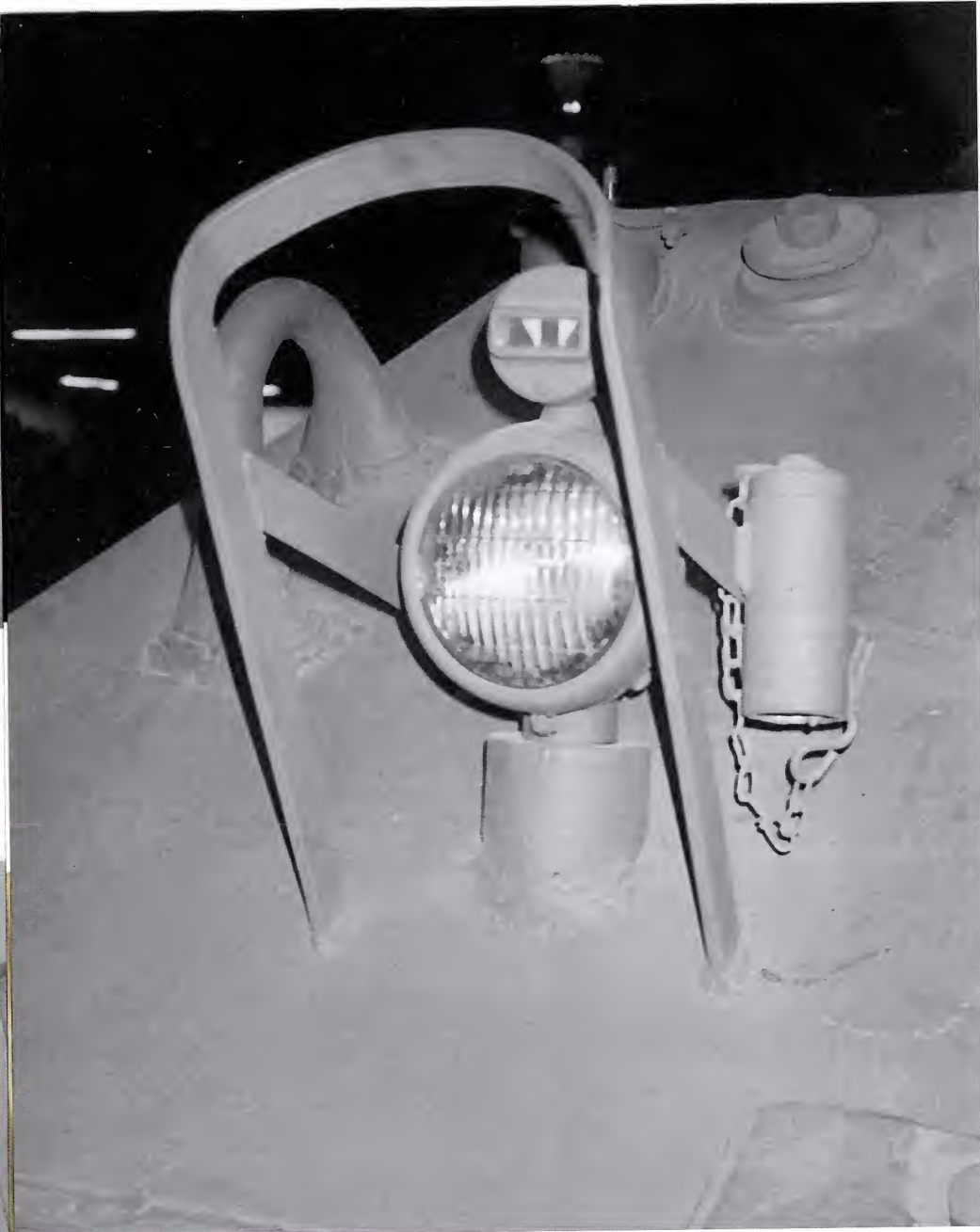
The step was bent steel strap welded directly to the transmission cover – as were the substantially larger towing lugs. An L-shaped pin has been inserted into the tow eyes. Although not present here, the pin was often fastened to the hull or towing lug using a small retaining chain. (Ward)

A headlight and horn were mounted on the vehicle's port front side. The headlight plug to the left of the headlight guard was inserted into the light mount when this light was stowed. A retaining chain kept the plug from being lost. This and the next two photos are actually of an M36, but the fittings are identical to those found on the M10. (Ward)

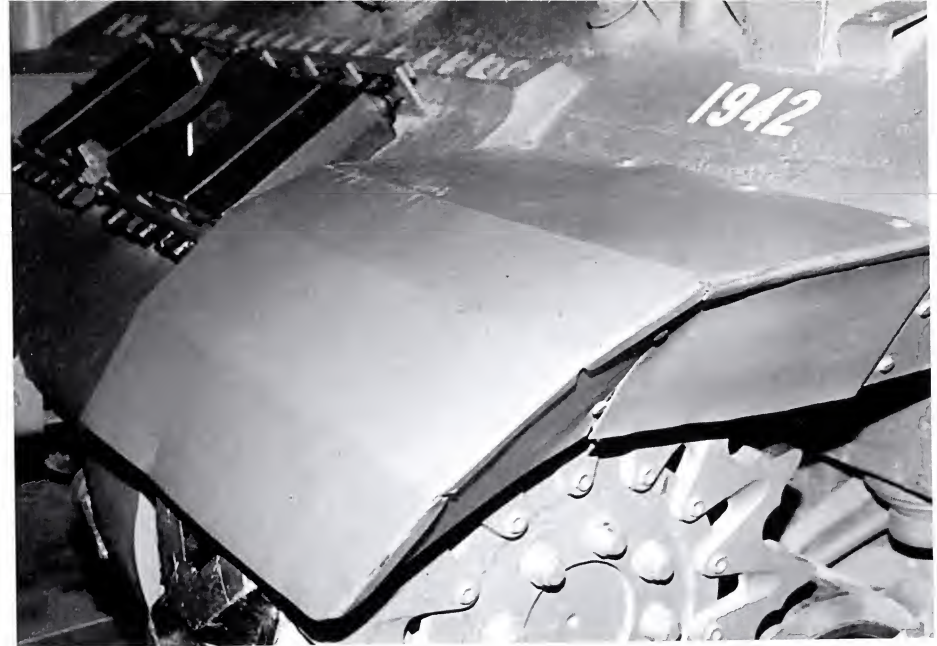


A horn was mounted on a small plate set at a slight angle beside the port headlight. There were a number of different casing types used to house the horns during World War Two. (Ward)





Another headlight was also located on the starboard side and was identical to that mounted to port. Brush guards made of bent steel straps protected the lights from such obstacles as tree and shrub branches. A small blackout headlight is mounted atop the standard headlight and was used for operating under blackout conditions on the front line. (Ward)



Sheet metal fenders and side skirts were attached to the hull to keep down dust and mud. They were easily bent or ripped off in the field and were seldom replaced. Both the fenders and dust shields were attached using small bolts. (Ward)

A vertical brace was welded to the inside of the inner fender to provide additional support. This was usually done at the factory, but also was performed as a field modification.





(Above) There were a number of fender variations fitted to M10s. The most common variation was this hinged unit that allowed the fender to flip up and back to reduce damage. Three hinges were mounted across the width of the upper surface. (Ward)



(Above Right) This posed photo of an M10 crew shows the numerous appliqué armor attachment bolts on the hull side. It is believed the lugs were never used operationally for their intended purpose. Instead, the lugs became a convenient means of attaching additional stowage racks. Track grouser racks are located behind the crew, while a machine gun tripod is tied down to bolts under the antenna. The poles at the vehicle's ends are for camouflage netting. The M10's five-man crew consisted of the commander, gunner, loader, driver, and co-driver. The first three were located inside the turret, while both drivers sat inside the forward hull. The crewmen wear the standard US Army leather vehicle helmet used during World War Two. (USA/NA)



(Right) The net pole holders were not a standard feature on all M10s and were sometimes mounted on the hull sides. The lower edge of the aft hull shows the proper location for the axe and tension-adjusting wrench. This vehicle is equipped with the later stamped steel road and idler wheels and has an exhaust deflector mounted under the rear of the engine deck. The turret counterweight is the late style 'duckbill' type, which went into production in late 1943. (USA/NA)



Taillights, lift rings, equipment stowage brackets, and an infantry telephone box were mounted on the aft hull. The lights are located outboard of the lifting rings. The rectangular box just below the gun barrel brace is for the sledgehammer, while the shovel mount is below. The pickaxe handle and pry bar mounts – normally under the shovel – are missing from this vehicle, along with axe and track tension bar holders. The pickaxe holder is mounted at an angle adjacent to the number 1942, while the box and cable are for the infantry telephone. (Ward)

Close communications with the infantry was vital, resulting in both tanks and tank destroyers being fitted with infantry telephone boxes on their rear hulls. The bracket and center collet for the pickaxe head are located to starboard of the light and phone. Above the collet are tie down strips – usually short lengths of steel rod welded to the hull. The starboard light was the blackout light used for night driving. (Ward)



The lift ring is identical to those on the front hull, with foundry numbers stamped on the ring's side. The taillight is attached to a small plate, which is bolted onto the hull. A steel strap guard welded directly to the hull protects the light. The red taillight was used for daytime driving. The curved shovel holder is mounted to starboard of the lift hook. (Ward)

A tow pintle was centered at the bottom of the aft hull plate. This pintle was bolted to a mounting bracket. It could be used to pull a trailer with extra ammunition or equipment during a road march. The pintles were rarely used in combat. (Ward)



Pulling the handle to the right opened or closed the latch. The M10/M36 was capable of pulling most standard trailers designed for vehicle use as well as medium size artillery pieces. Some M10s, with their turrets removed, were used as prime movers late in the war. (Ward)





Towing lugs were welded to both sides of the rear hull plate. The lugs were also equipped with L-shaped pins held in place by a cotter pin on the bracket's far side. The tow lugs employ a particularly heavy weld bead to attach them to the hull. (Ward)



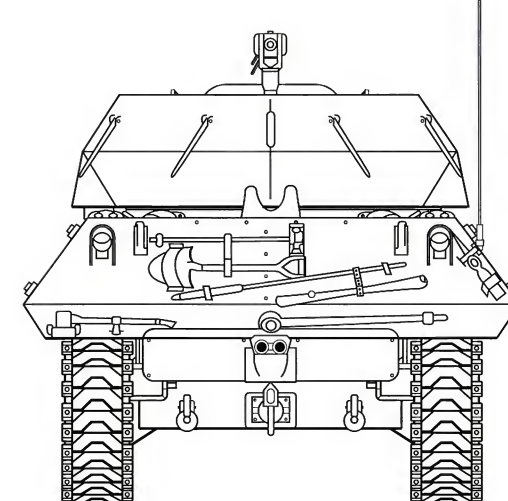
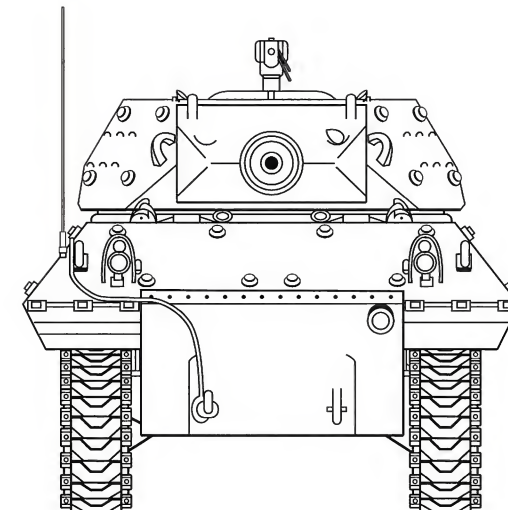
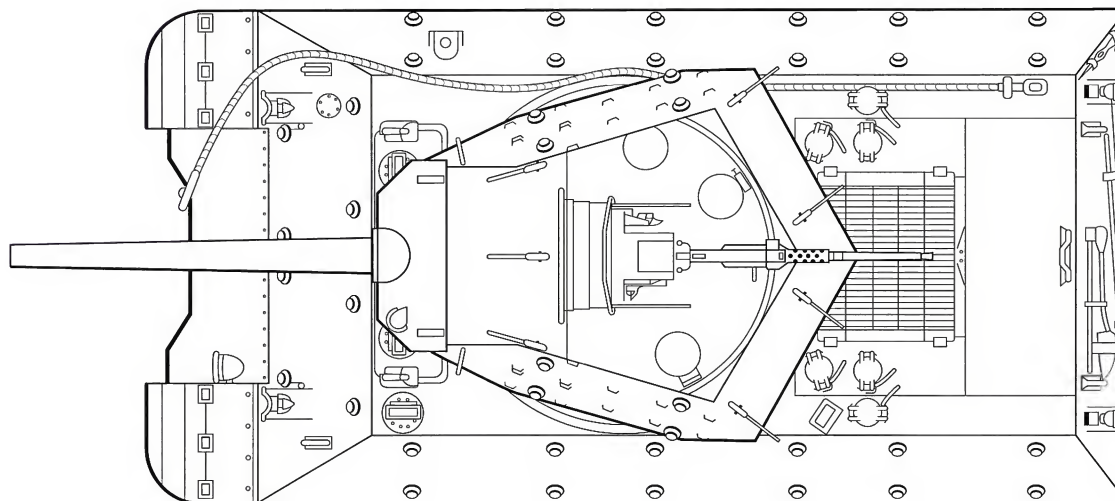
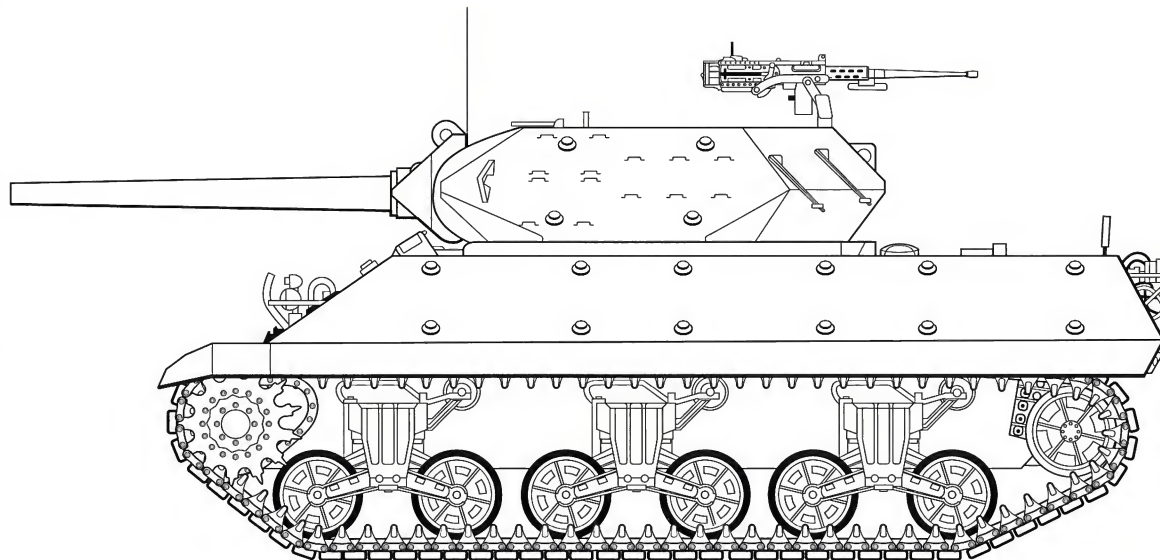
Track grouser racks could be fitted to both hull sides. These racks were designed to be fastened to the appliqué armor bolts. Up to five grousers could be carried on each rack section and were staggered for clearance. Grousers were used to improve track grip under poor ground conditions.

Both the M10 and M36 carried an SCR 610 radio. The antenna and its mount were housed within an indentation in the starboard hull. This antenna could be unscrewed if need be. Two small screws to port of the mount were tightened down when the antenna was inserted into the holder. The appliqué armor lug is missing its bolt.

Provisions were made for supplementary appliqué armor on both the hull front and sides and along the turret sides. A threaded lug was welded to the hull and turret armor plates. Additional armor plates were mounted to the lugs and secured with the bolt. These plates are not known to have been used operationally.



The complete antenna assembly consisted of a mount with an integral spring coil and brown glass insulator, a whip antenna, and protective cover for use when the antenna was removed. This antenna is on an M36, but is identical to those used on earlier M10s. Both this mount and the previous antenna mount were manufactured by Ohio Brass, whose name was stamped on the mount. (Ward)



M10 Gun Motor Carriage (GMC) Specifications

Length:.....22 feet 5 inches (6.8 m)

Width:.....10 feet (3 m)

Height:.....9 feet 6 inches (2.9 m)

Empty Weight:.....60,000 pounds (27,216 kg)

Combat Weight:....65,000 pounds (29,484 kg)

Powerplant:.....One 410 HP General Motors 6046 12-cylinder, inline, liquid-cooled engine.

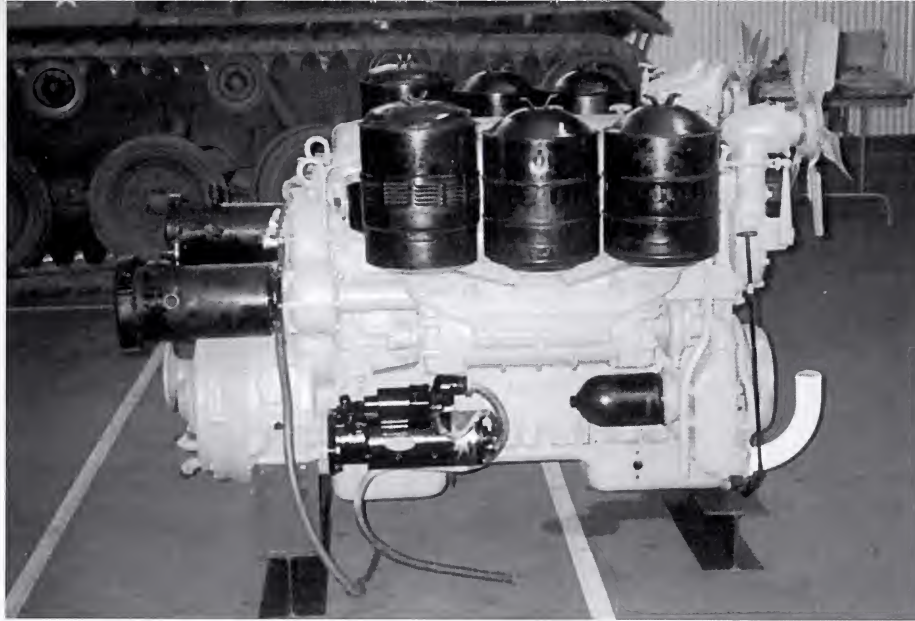
Transmission:Synchronesh – Five speeds forward, one speed reverse

Armament:.....One turret-mounted 3 inch (76mm) M7 gun with 54 rounds, and one .50 caliber (12.7mm) Browning M2HB machine gun with 1000 rounds on aft turret position.

Maximum Speed:..30 MPH (48.3 kmh)

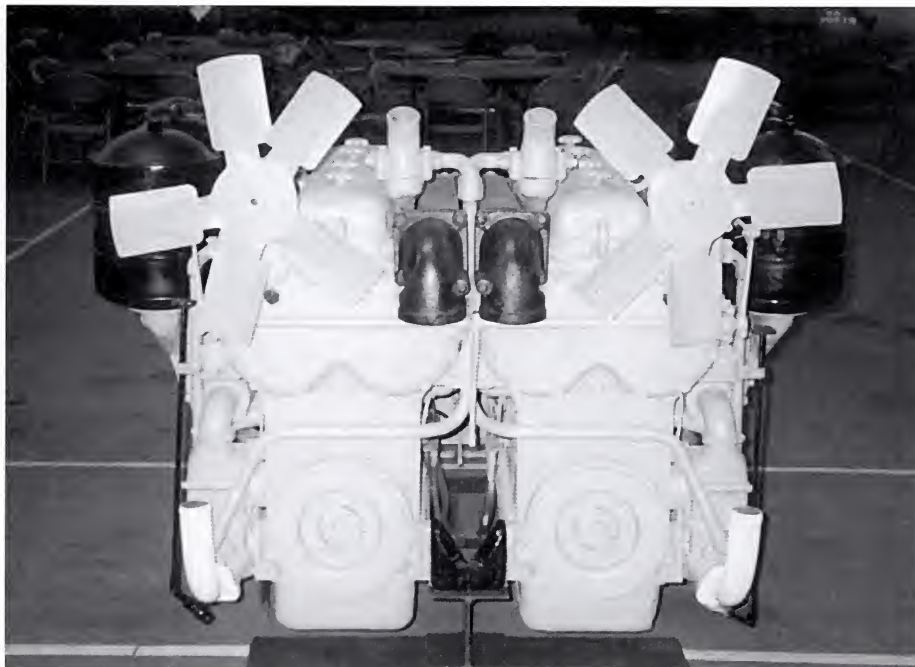
Range:.....200 miles (321.9 km)

Crew:.....Five



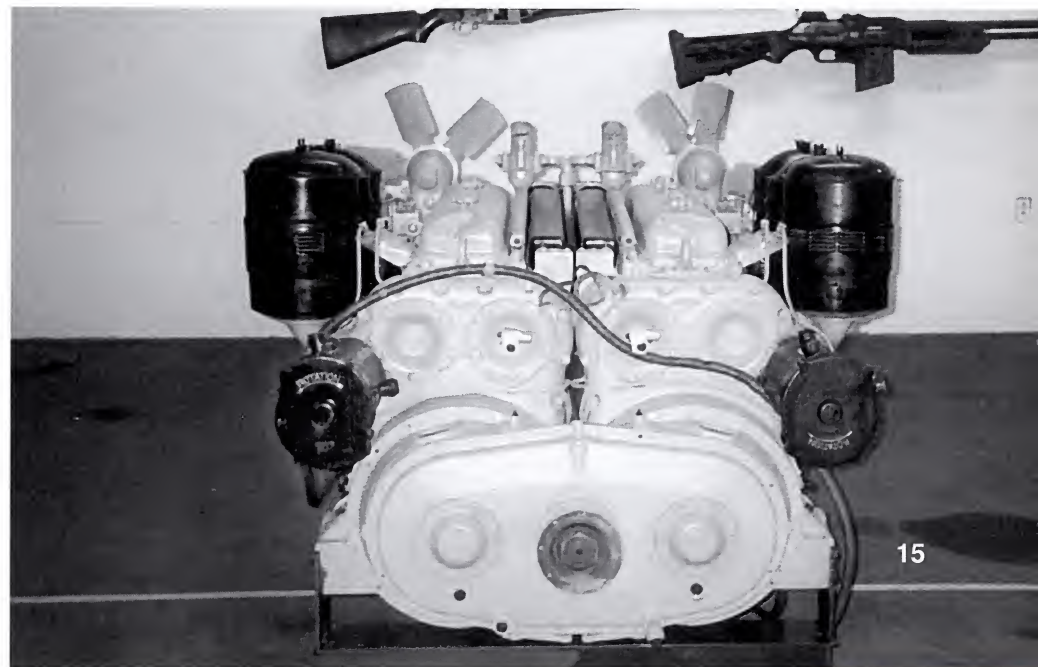
The M10 was powered by the 410 HP General Motors (GM) 6046 12-cylinder diesel engine. This powerplant resulted from combining two GM 6-71 six-cylinder diesel truck engines into a single unit. Each engine bank could operate independently of the other, if necessary. This is the powerplant's port side – the vehicle's front would be to the left. (Ward)

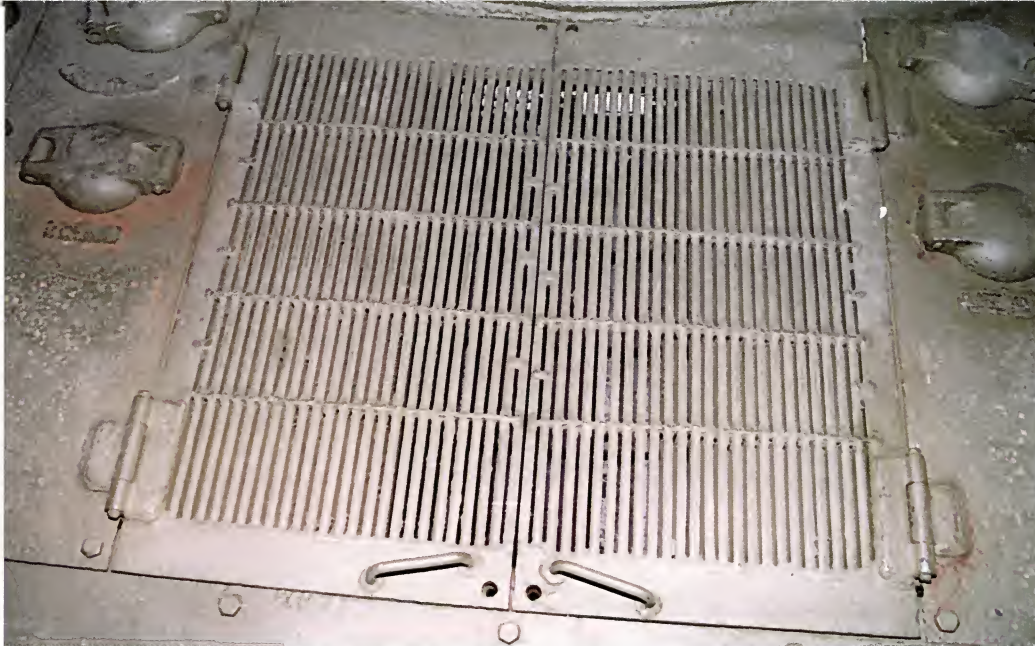
Two exhaust manifolds were ducted over the top of the engines and ended in two elbow pipes. The engine cooling system's thermostat housings are located above the exhaust manifolds. Pipes running on either side of the bottom corners are attached to the oil cooler housing, while the pipes running up at an angle are the water by-pass tubes. The prominent cooling fans ducted air through the radiators mounted at the rear of the vehicle. (Ward)



Three cylindrical air cleaners were mounted on each side of the GM 6046 engine. Electrical generators were mounted aft, while the starting motor and electrical cable are mounted below the air cleaners. The bullet shaped object is the oil strainer, which filtered harmful dust and sand from the oil. (Ward)

The oval shaped fitting on the bottom of the engine front is the transfer case. This is where the engine crankshafts were connected to the drive shaft. The generators were mounted on the engine front, while the air cleaners were mounted along the upper flanks. (Ward)





M10s were equipped with two engine access grills on the engine deck. These grills were hinged outward to expose the engine for maintenance and repair. The M10A1 grill was much wider, being based on that of the M4A3 tank. There were three armored fuel cap covers on either side of the engine grills, although only two cap covers are visible. (Ward)

The handles were attached to a cable that activated the extinguisher when pulled. These handles were normally painted red, but were overpainted Olive Drab on this restored M10. The small hole on the right side of the square is a water drain. (Ward)



Three armored fuel tank covers were located on each side of the engine access grills. The port side of the engine deck also housed the external engine fire extinguisher handles, which were protected by a small box. Pulling the T-shaped handles activated the fire suppression system within the engine compartment. Each handle activated an extinguisher on one side of the compartment. (Ward)

The aft edge of the engine deck contained an armored cover for the coolant filler port and the gun barrel rest. The gun barrel was positioned in the curved cradle when traveling in a non-combat situation. Securing the barrel lessened the chances of throwing the weapon and its sights out of alignment when traveling over rough terrain for extended periods. (Ward)





Both the driver's and co-driver's positions were equipped with a one-piece hatch. The hatches were hinged outboard and each was equipped with a single M6 periscope. The driver had an additional periscope to the left of the hatch. This is the co-driver's hatch on the starboard side. Both hatches were mirror images of each other. (Ward)



The brush guard protected the periscope from errant crew feet or branches sweeping across the top of the hull. Its angular shape provided good protection without taking up too much room. This was important since the periscopes had to swivel to provide all round visibility to both drivers. They used the periscopes to see outside the vehicle when the hatches were closed due to enemy action. This severely reduced the amount of visibility compared to looking through an open hatchway. (Ward)

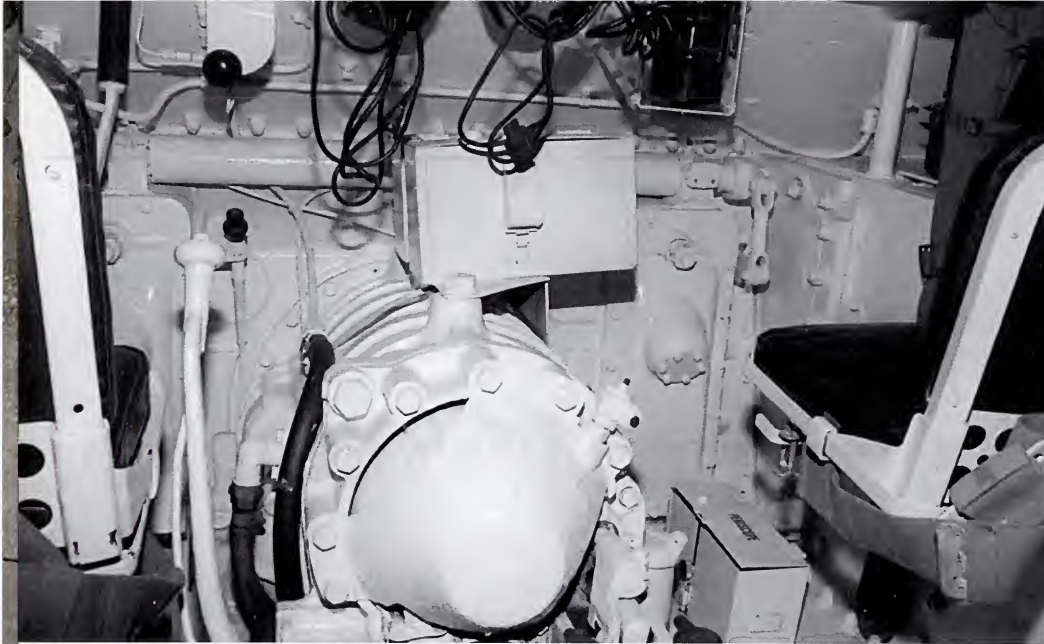


Both the M10 and M36 were equipped with a third periscope mounted in the hull roof to port of the driver's hatch. The latch next to the periscope is the release handle for the driver's hatch when it is open. The hull side and roof plates featured prominent weld seams. (Ward)

The drivers' solid steel hatches opened outward and rested at an angle of approximately 45°. The periscope housing was moveable and the M6 periscope could be replaced if damaged. Inner hatch surfaces were painted the same Olive Drab as the vehicle's exterior to blend in with the outer surface when opened. (Ward)

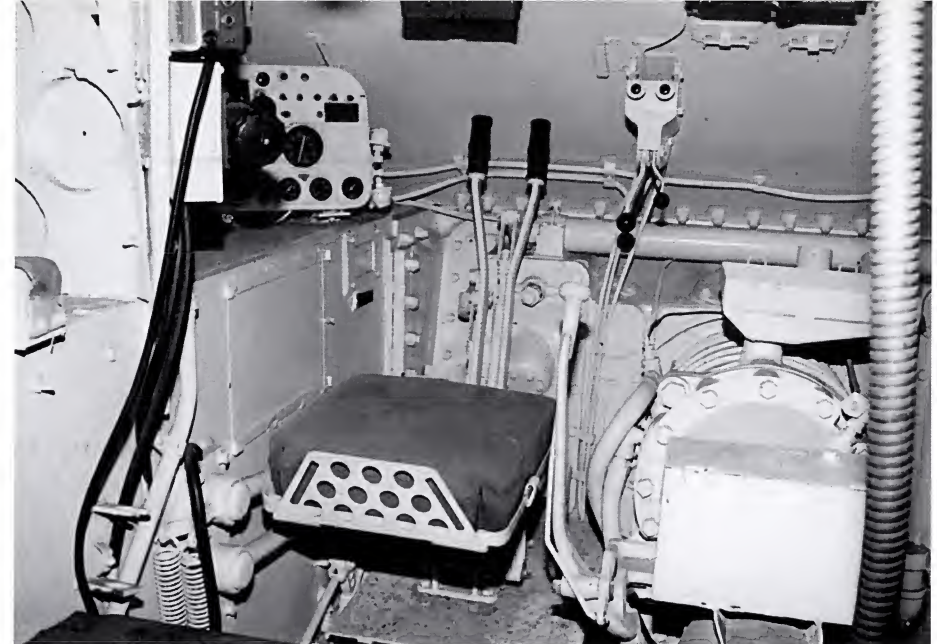
A small pin was set into the back of the periscope housing. When pulled, this pin released a spring that held the periscope in place and allowed the periscope to be removed and replaced. Replacement periscopes were carried in the drivers' compartment. (Ward)





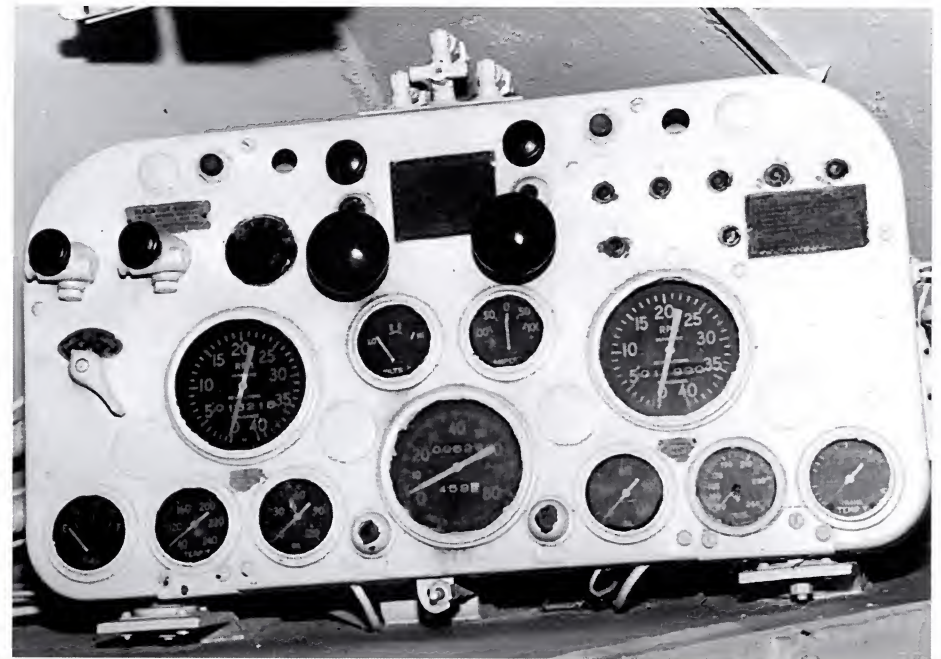
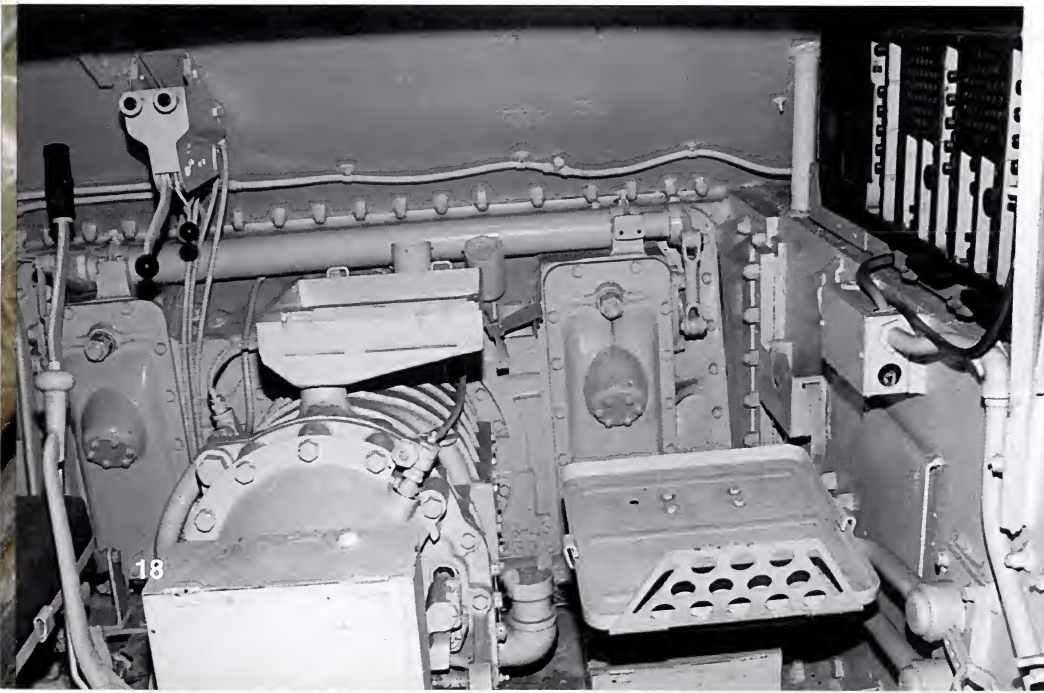
The M10 and M36 drivers' compartments were nearly identical. The driver sat to port while the co-driver was to starboard. The transmission was centered between the two drivers' positions. Drivers' compartment interiors were painted white for improved interior lighting. (Ward)

The co-driver sat to starboard. This seat pan lacks both the cushion and back. The rectangular shape in front of the seat is the brake housing cover, while the round projection covers the steering brake adjusting hole. The co-driver also functioned as the radio operator, using the SCR 610 radio installed in the right front sponson. (Ward)



The driver sat on the port side of the M10/M36. His seatback has been removed on this particular vehicle. The steering levers were placed immediately in front of the driver, while his instrument panel was set into the hull sponson. Both drivers' seats could be adjusted vertically on the spring-loaded arms attached to the sidewall. (Ward)

The M10 driver's instrument panel had dual gauges for the twin diesel engines along with standard gauges. The two large gauges in the upper row are the tachometers, while the two smaller units between them are for the voltage and amps. On the bottom (from left to right) are the fuel gauge, engine temperature gauge, two oil gauges, an engine temperature gauge, and the transmission temperature gauge. (Ward)





The M36 instrument panel was similar to that of the earlier M10, but lacked the extra gauges since it was powered by a single 500 HP Ford GAA 8-cylinder, liquid-cooled engine. The driver's side periscope is located next to the fire extinguisher. The first aid kit is mounted to port of the extinguisher. (Ward)

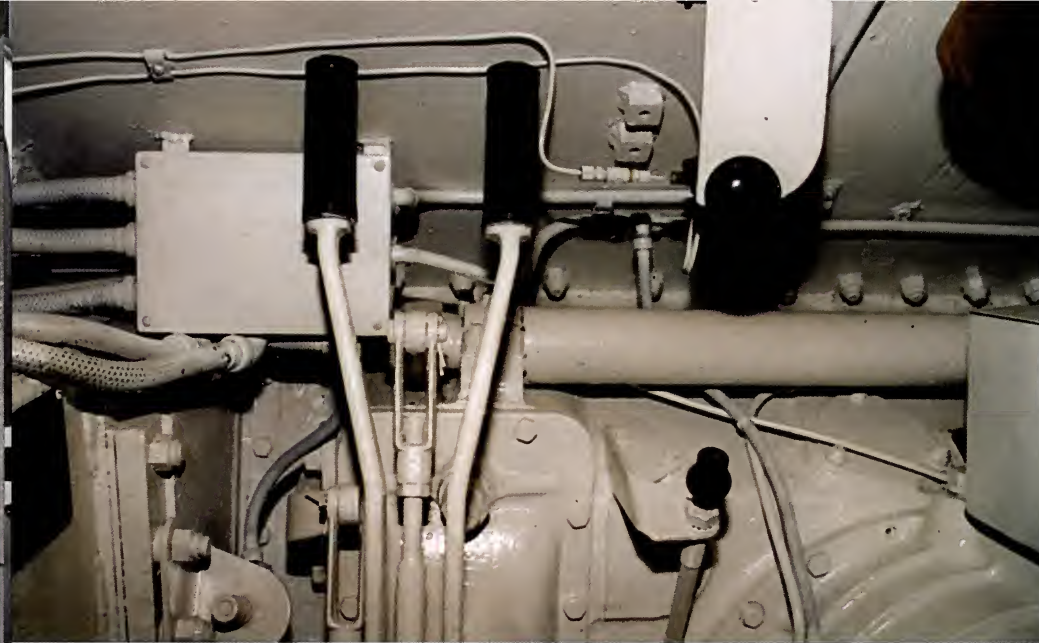
The bulkhead was directly opposite the driver's seat and formed the front of the port forward ammunition storage area. This area housed 24 rounds of 3 inch ammunition, with 24 more rounds in the starboard area and six in the turret. The bulkhead also had a clip for the standard army flashlight. (Ward)



The first aid kit was attached to a bulkhead to port of the driver's position. Two sets of webbing straps secured the kit to the bulkhead. An additional first aid kit was often carried on the outside of the vehicle. This kit contained basic first aid material along with instructions printed on the lid's inner surface. (Ward)

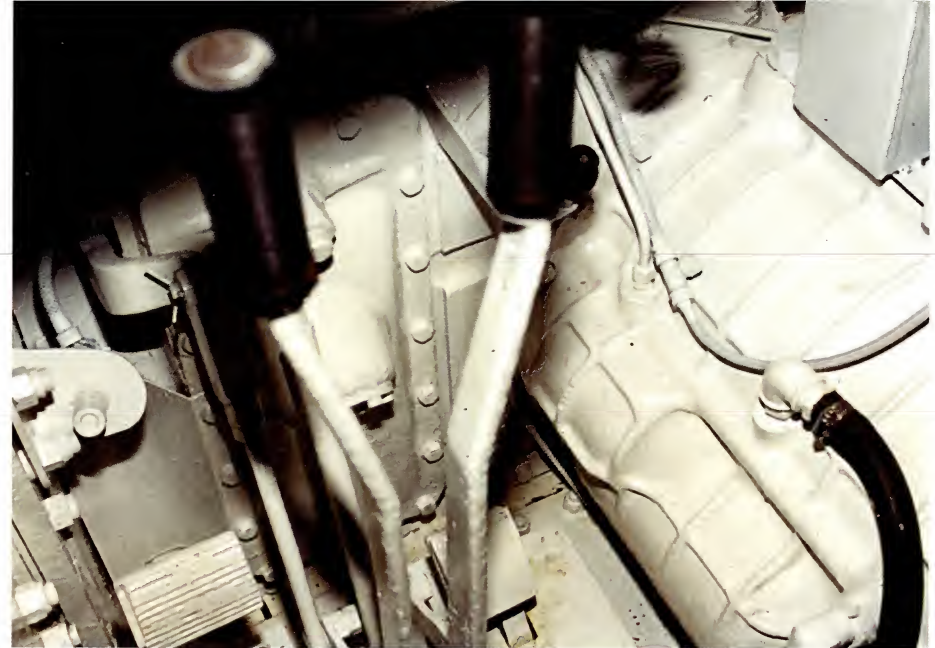
The driver's seat height adjustment mechanism was mounted on the lower hull side. This enabled the driver to raise his seat with an opened hatch. Seat belts are attached to a plate on the seat back. The six speed synchromesh transmission is at right. (Ward)





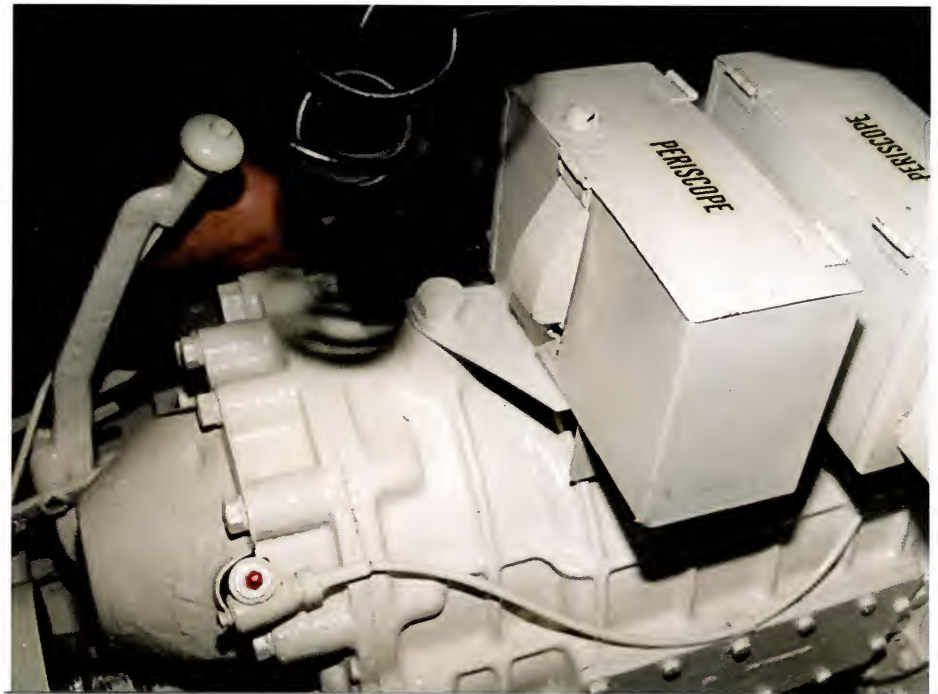
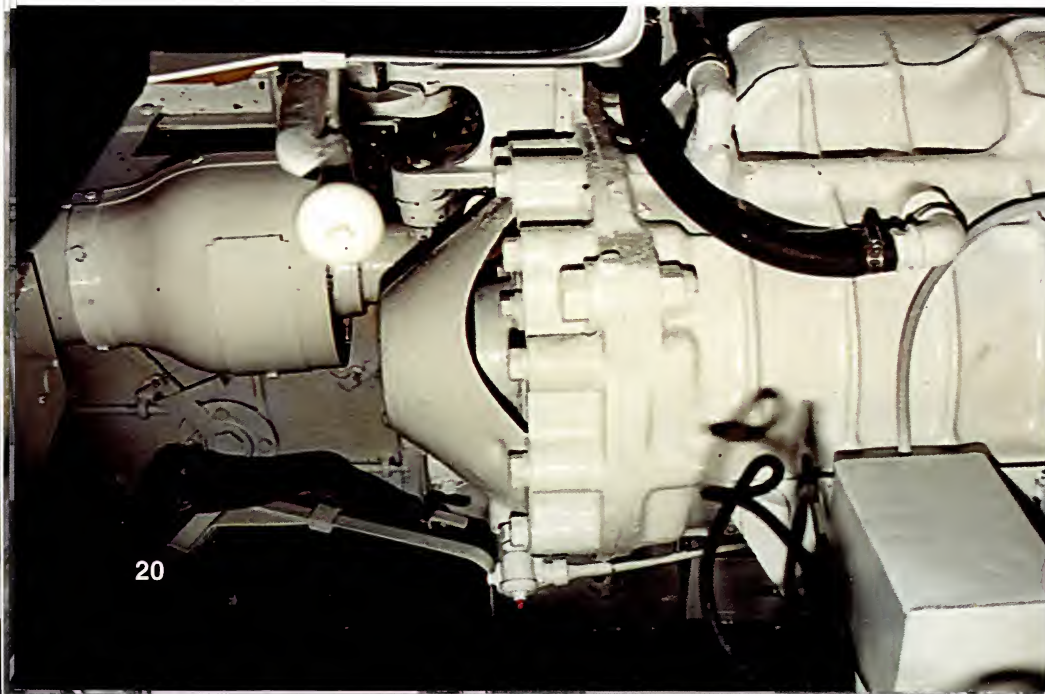
Steering the M10 and M36 was accomplished using two levers, which are topped by black handles. Pulling one lever back caused that side of the track to brake, resulting in the vehicle pivoting as the other track continued to turn. The M10 and M36 had a 62 foot (18.9 m) diameter turning circle. Pulling both levers back caused the vehicle to slow and stop. (Ward)

The transmission and drive shaft separated the drivers' positions, resulting in a tight fit. Nevertheless, it seems that the interiors of the M10 and M36 were roomier and more comfortable than that of an M4 Sherman tank. (Ward)



Two foot pedals flank the steering levers. The left pedal disengages the clutch, while the smaller right pedal is the accelerator. The driver's position is alongside the transmission housing, while the co-driver's position on the starboard side had identical controls. (Ward)

Extra periscope stowage boxes were mounted above the transmission housing, to port of the co-drivers position. The latch covers a slot that holds the periscope in place. A coiled intercom system cable hangs down from the ceiling. (Ward)





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Each box held a single M6 periscope, which was clipped in the slot on the side of the box covered by the latch. Turning the knob secured the periscope in the periscope mount. The driver had two periscopes in and around his hatch, while the co-driver had only one. (Ward)

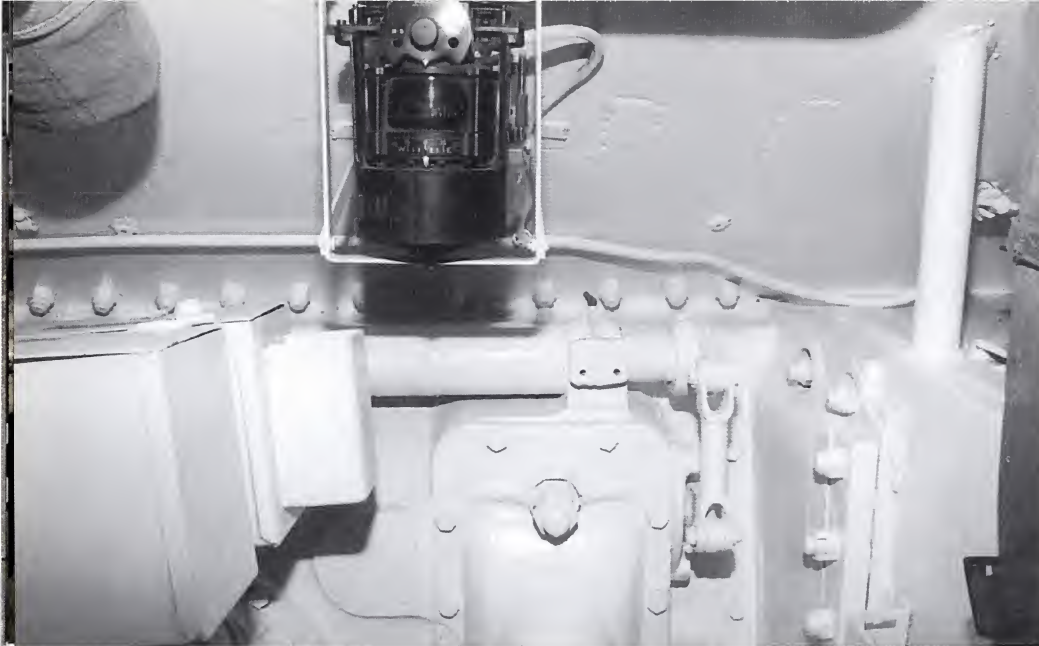
The co-driver sat on the starboard side of the hull. His hatch-mounted periscope is above the seat, while the canvas signal flag case and the radio are to the right. Another periscope storage box is on the floor between the transmission and seat. (Ward)



M10s and M36s were equipped with an intercom system to allow intra-vehicle communication. Each driver had his own headset and control box and these were connected with the other crew positions. Attachment points for the drivers' canteens were mounted on the front bulkhead. Leather pads around the upper right hatches protected the drivers from injury when driving with the hatches open. (Ward)

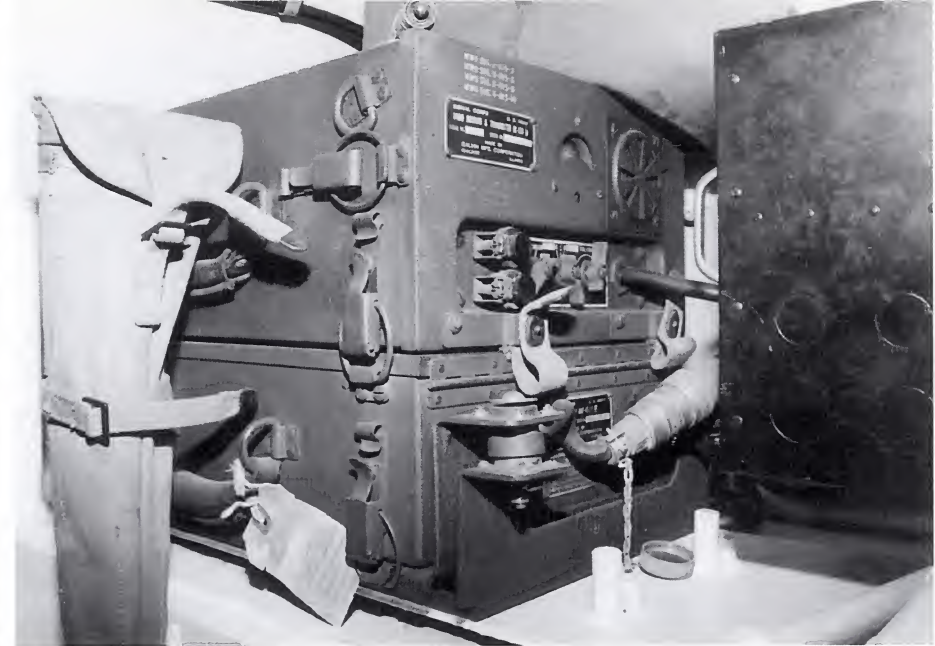
The vehicle's radio and relay box was mounted into the starboard sponson. A canvas signal flag case was also stowed here. Signal flags were used in only limited circumstances, when visibility was good and radio silence was required. (Ward)





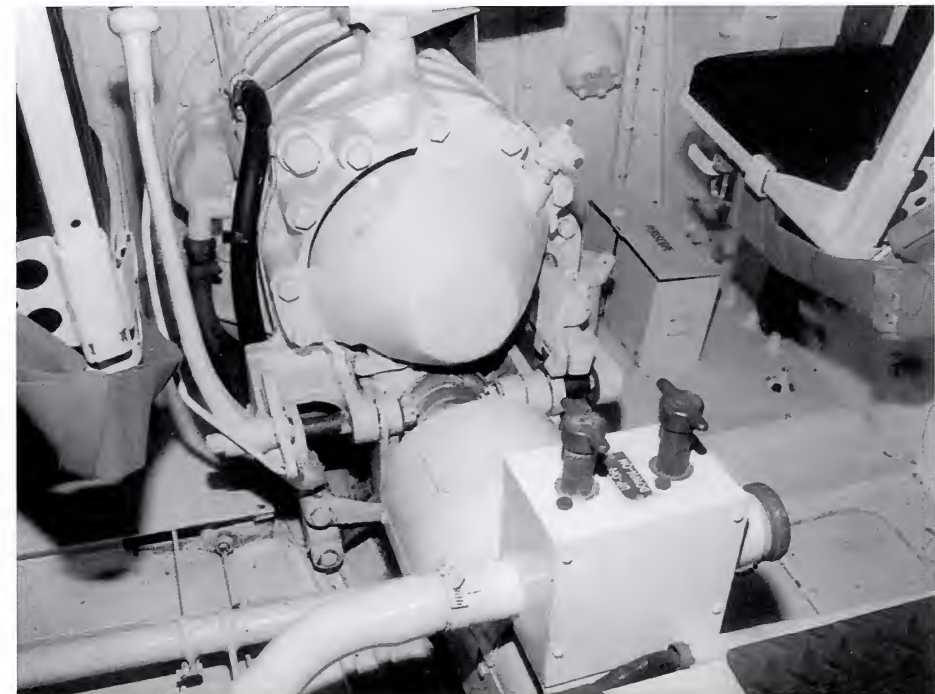
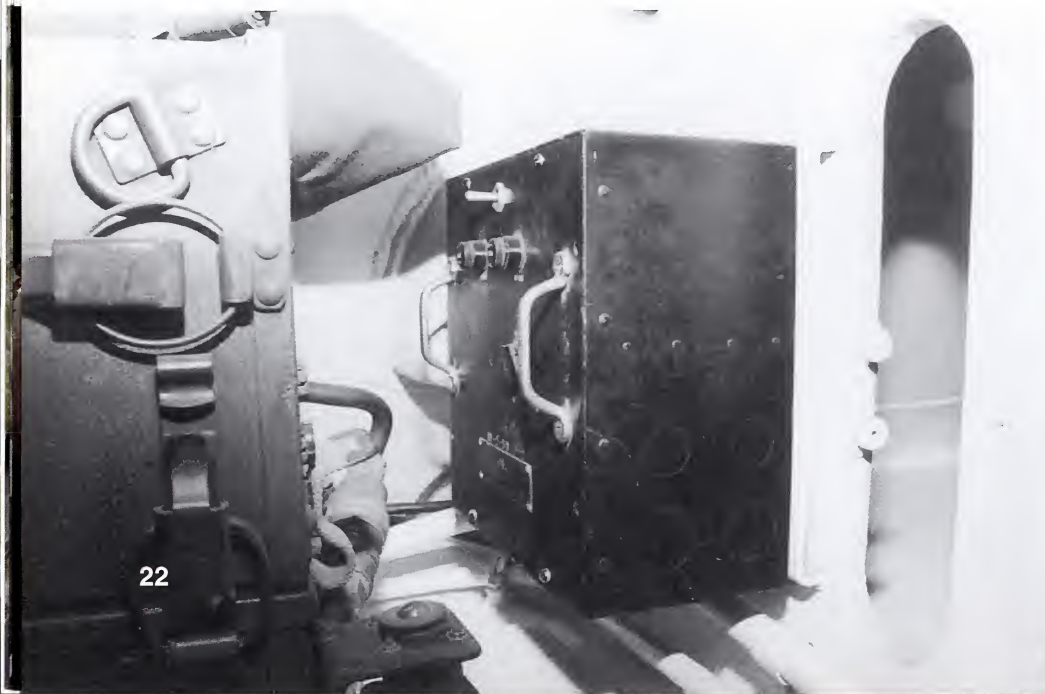
The co-driver had a compass fixed to the front bulkhead for navigation and position fixes. Neither the M10 nor the M36 carried a bow machine gun like the M4 tank. The lack of a machine gun and its associated ammunition stowage freed up some space in the co-driver's position. The M36B1, which used the complete M4A3 tank chassis and hull, was the only tank destroyer to carry a hull-mounted weapon. (Ward)

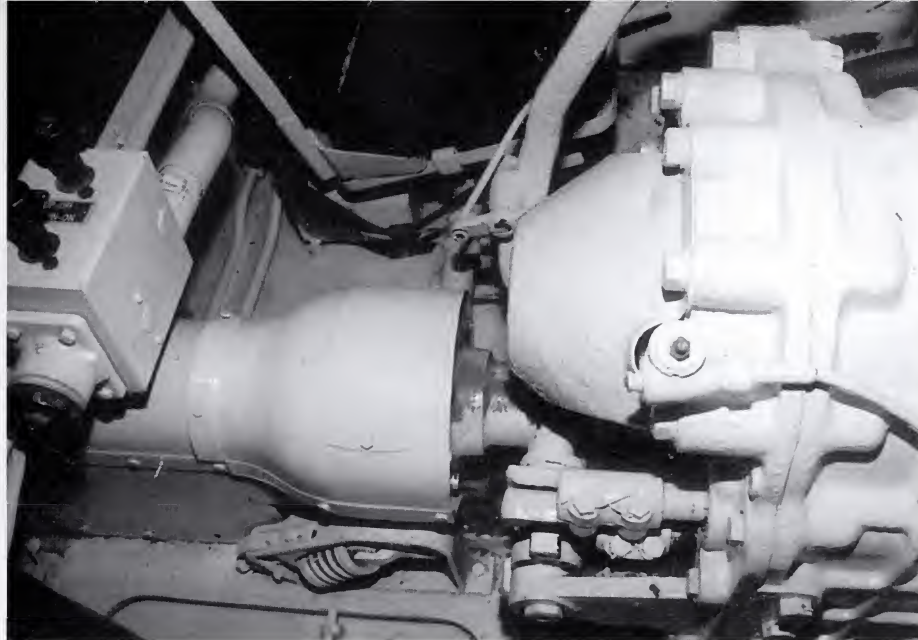
The intercom amplification box was mounted on the right sponson bulkhead behind the radio. The on-off toggle switch is located at the top while two adjustable rheostat knobs are mounted below. (Ward)



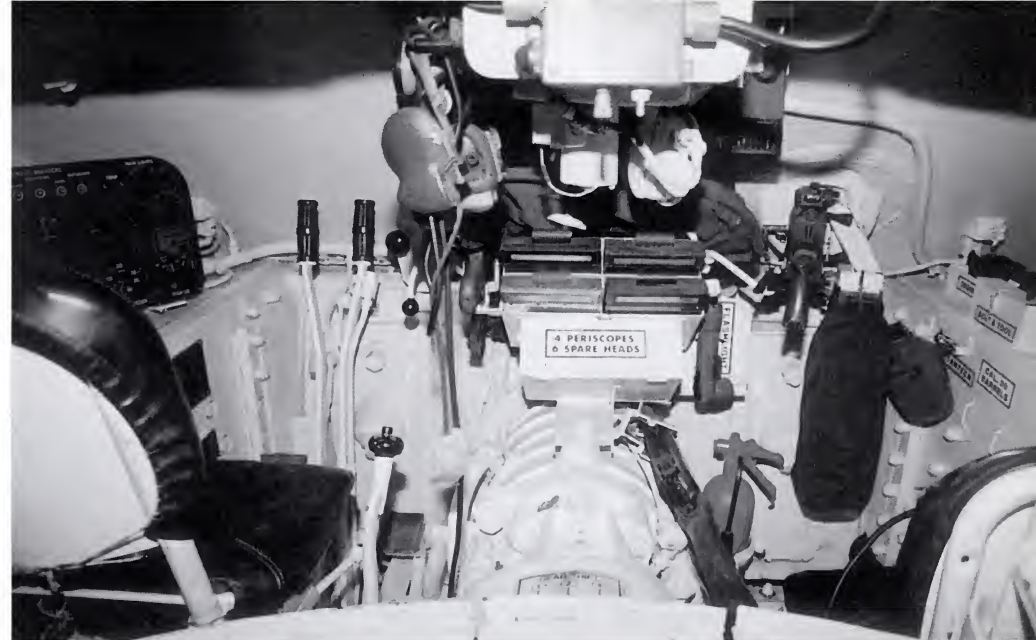
Both the M10 and the M36 carried an SCR 610 radio in the right sponson, beside the co-driver. This allowed the vehicle to communicate with other vehicles, lateral units, and higher headquarters. It provided reliable in service and was easy to maintain in the field. (Ward)

The drive shaft ran beneath the fighting compartment floor plate to connect to the transmission. The gearshift lever is mounted to port of the transmission housing. The emergency escape hatch is barely visible underneath the co-driver's seat. (Ward)



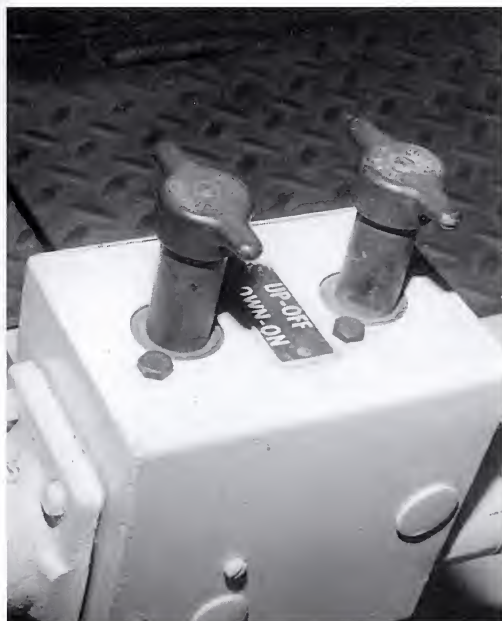


A circular shield protected the crew from the drive shaft when it was turning. The main electrical shutoff box was mounted behind the transmission atop the drive shaft housing. The capped socket on the near side is where a cable was connected to jump-start the vehicle in the event of dead batteries. (Ward)

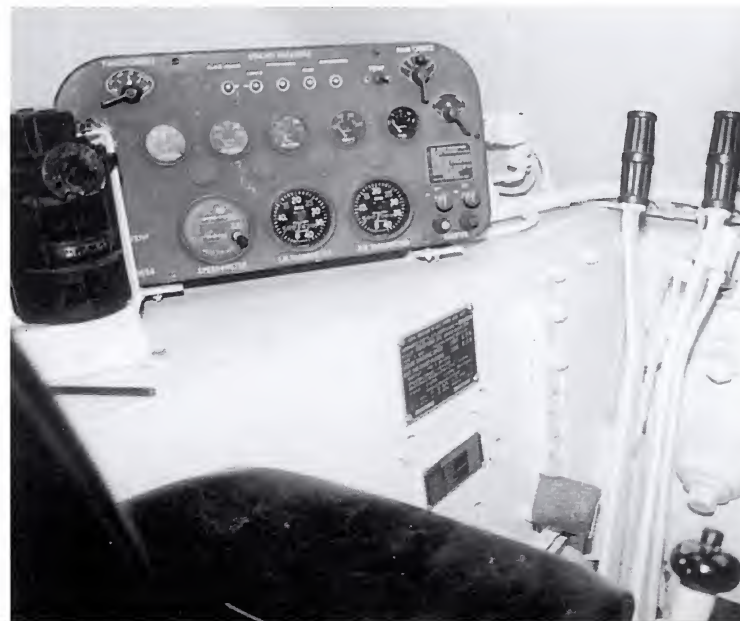


This M4A3 Sherman drivers' compartment is virtually identical to the M36B1 Tank Destroyer, which was based on the M4A3 tank. Although there were many similarities to the standard M10/M36; there were also many differences – including the co-driver's hull mounted .30 caliber (7.62mm) machine gun and its ammunition and spare barrel stowage. (Green)

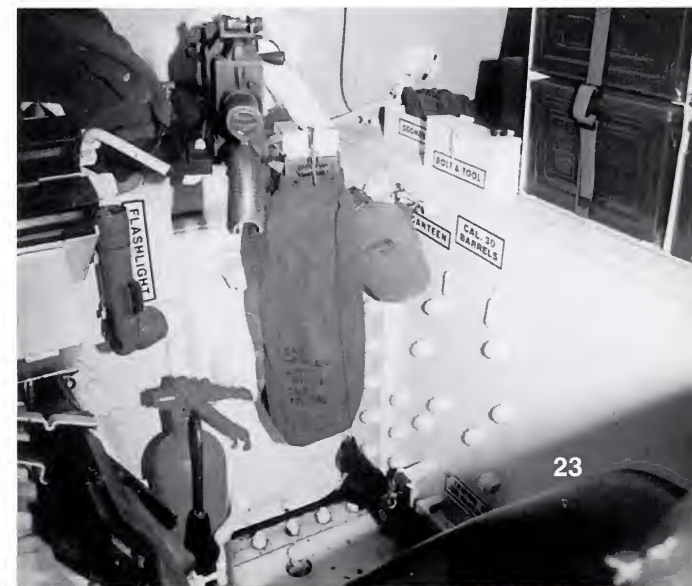
Two knobs are mounted atop the main electrical shutoff box. These knobs were used to energize the system – when pushed down the unit was on; when pulled up, the system was off. (Ward)

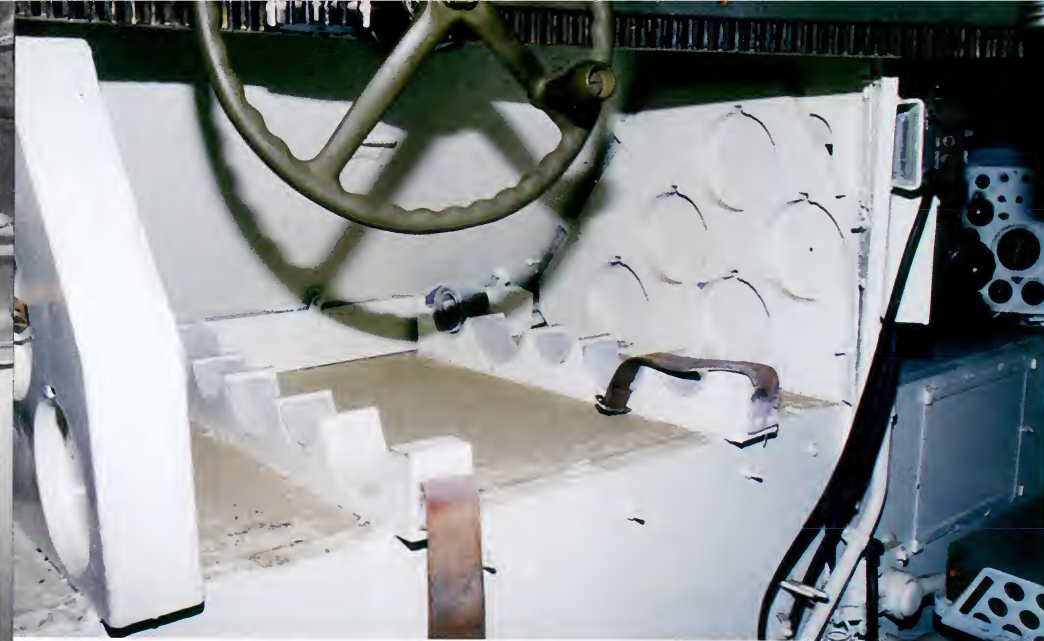


The vertical sides of the M4A3 provided more room than the sloping sides of the M10/M36. The driver's controls were identical on all the vehicles, but there were minor changes to the instrument panel. Manufacturer's nameplates for this vehicles were riveted to the bulkhead. (Green)



The main difference between the M36B1 and the earlier M10/M36 vehicles was the hull machine gun position. Ammunition boxes occupied the sponson area previously used by the radio, while spare machine gun barrels were clipped to the lower hull side. The M36B1 was the only American tank destroyer of World War Two armed with a hull machine gun. (Green)





The M10 hull sponsons were divided into four sections for stowing 3-inch (76mm) ammunition. Two sections were located on each side of the hull for the rounds and their fiberboard containers. This is the port forward section immediately behind the driver's position. The turret traverse wheel is located at the top along the turret ring. (Ward)



Indentations on the racks held the ammunition containers, while semi-circular brackets held the lower rounds in place on the bottom. The rounds were secured using two canvas straps, which were attached to the hull on the bottom and buckled at the top. This is the rear of the port forward storage position.

A second set of ammunition racks was located behind the co-driver's position. This rack is identical to the unit behind the driver's position. Forty-eight rounds were stored in the hull – 24 rounds each to port and starboard. (Ward)

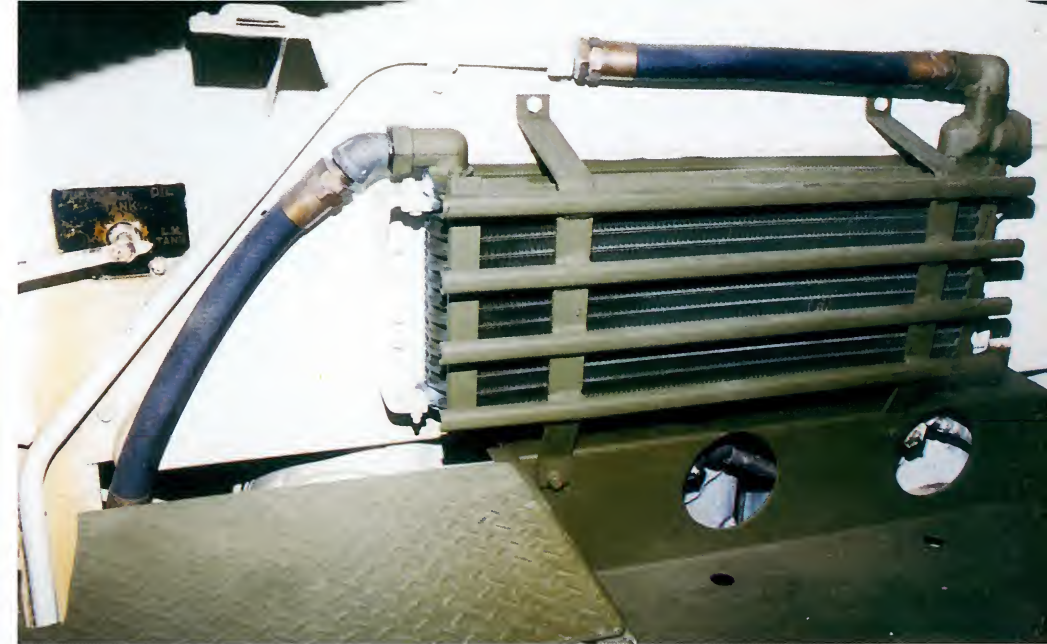
The ammunition stowage in the M36B1 hull was revised due to the larger and longer 90mm rounds. The indentations for the fiberboard containers were deleted and the containers were stacked and held in place by the retaining straps. The M36's 90mm gun was supplied with 47 rounds of ammunition: 18 in each sponson and 11 in the turret. (Ward)

The ammunition retaining strap was made of Olive Drab canvas and featured the standard Army style buckle. It was threaded through a tie down welded against the sponson side and another on the sponson floor. (Ward)





The M10 did not have a turret basket, which resulted in a relatively uncluttered floor. The oil coolant radiator is located in the center of the fighting compartment aft bulkhead. The cable running from the box on the floor carries electricity to the turret. The M10 and M36 used a 24-volt Direct Current (DC) electrical system.

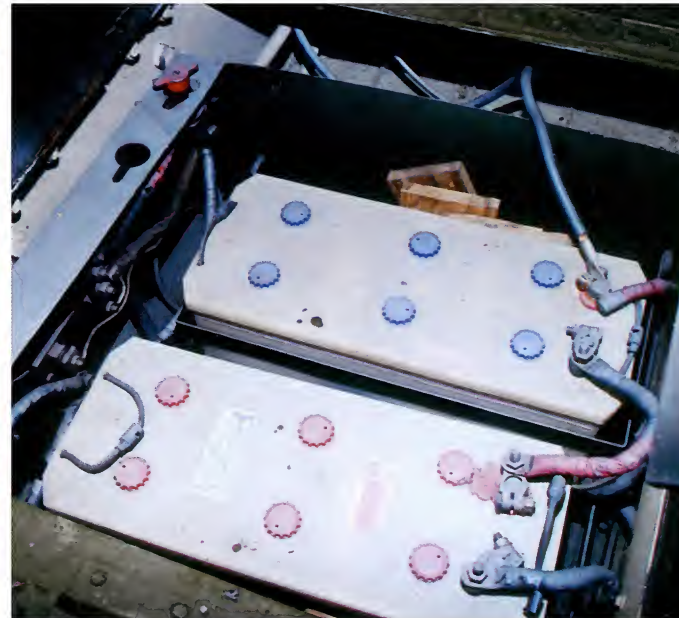


The length of the engine-mounted generators required the use of boxed extensions into the fighting compartment. These extensions flanked the radiator on the aft bulkhead. (Ward)

Two covers flipped up to provide access to the generators. Cables on the top and side of the generator carried power to a pair of 12 volt batteries. The 24 volt generator was driven by power tapped from the vehicle's engine.

The 12 volt vehicle batteries were located under the floor panels and provided power for the various electrical components needed to operate the vehicle. This museum vehicle is equipped with modern batteries. (Ward)

Other storage bins were located under the other floor panels, including this bin aft of the co-driver's position. The bins were used to hold small arms ammunition, spare parts, and tools, as well as the crew's personal equipment. The drive shaft housing is located to the left of the opened bin. (Ward)





The M10 turret was composed of rolled and cast homogeneous steel plates welded together. Four appliqué armor lugs were attached to the left and right turret side. The sides were one inch (2.5 cm) thick and angled inward at 15°. Track grousers are stowed on the hull side under the turret. (Ward)



The cast mantlet was 2.25 inches (5.7 cm) thick and angled on the top and bottom at 45°. Lift rings were mounted on both upper corners for removing the weapon from the turret. The flap for the gunner's M70G telescope sight is located on the mantlet's port side. The turret manufacturer and lot number are cast into the upper mantlet section. (Ward)



The 45° angle of the mantlet provided good shot deflection from all but the largest German anti-tank rounds. Additionally, the M10's armor was thickest at this point. The weld seams joining the various plates together were relatively neat and ran parallel to the plates. The mantlet moved with the 3 inch gun, which had an elevation range of +30° to -10°. (Ward)



The mantlet sides were beveled outward at approximately 30°. This increased its shot protection qualities. The collar surrounding the gun barrel was a separate piece welded into the mantlet. The barrel was slipped through the collar from the rear. (Ward)

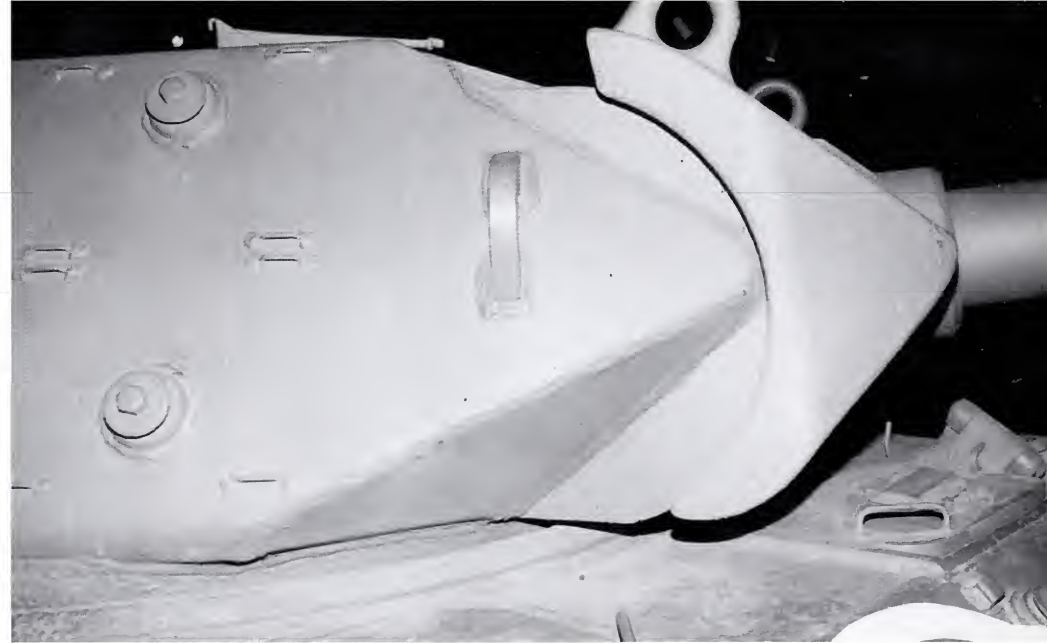
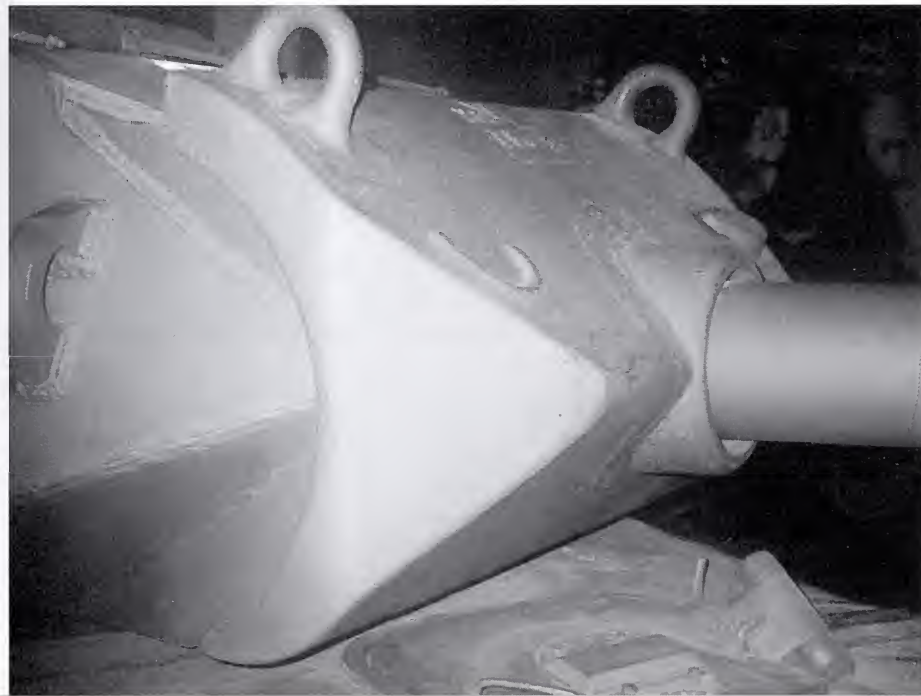


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Wide gun barrel collar weld seams appear on the upper half of the gun mantlet. These seams are also found on the undersurface. Foundry casting numbers are located just below the top of the mantlet. The two lift rings were cast and then welded to the top of mantlet. (Ward)

The side lift hook had a prominent weld seam around it while the mantlet rings were smoothly faired. The mantlet was fairly level and devoid of casting flaws. A semicircular ridge was cast into the upper starboard mantlet section. (Ward)



The lift rings on the turret side were flat compared to the rounded rings mounted on the mantlet. Appliqué armor bolt heads and tie down points were welded along the entire turret side. The tie down points were used for securing external stowage. (Ward)

The front turret roof was 0.75 inches (1.9 cm) thick. Three foul weather braces for a tarpaulin were arrayed across the top. These braces were normally folded flat when not in use. The roof was often used for markings to help prevent accidental bombing by Allied aircraft. This included the white star within a circle marking used from late 1943. (Ward)

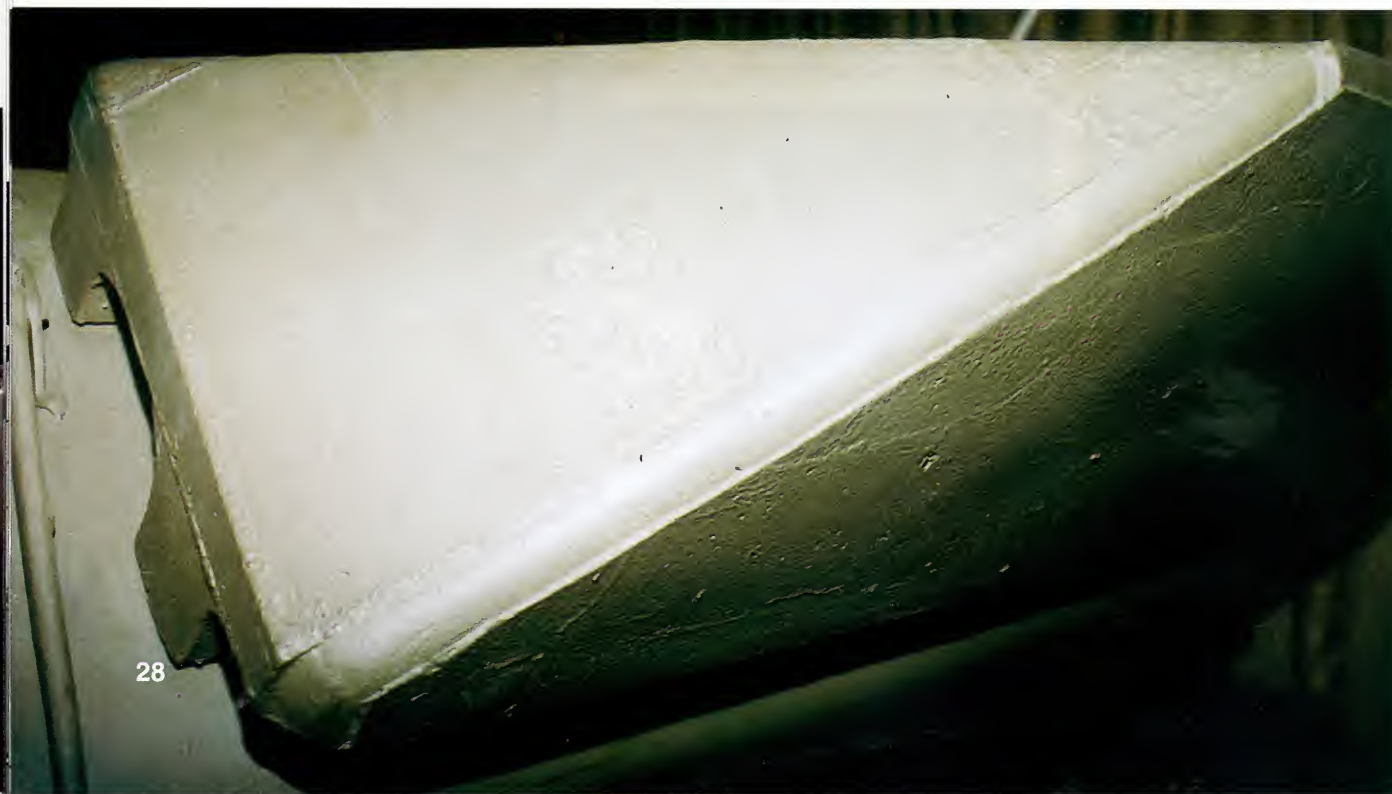




The one-inch (2.5 cm) side plate joined another one-inch plate at the turret rear. These plates were welded together with other plates in an angular pattern to maximize their armor protection capability. The 3-inch gun's 1990 pound (902.7 kg) weight required a counterweight on the turret rear for balance. (Ward)



The most common type of counterweight used on the M10 series was the wedge-shape version, which was introduced on mid-production vehicles. Earlier counterweights included grouser racks and grousers, block counterweights, and a later type known as the duckbill. The wedge and duckbill types proved most effective in countering the gun's weight. (Ward)



Fairly smooth weld seams connected the various sections of the wedge-shaped counterweights, which were bolted to the turret's aft section. This counterweight design weighed 3700 pounds (1678.3 kg) and helped solve the balance problem. The US Army considered this counterweight too heavy and this led to the development of the lighter, but still effective duckbill counterweight, which weighed 2500 pounds (1134 kg). (Ward)



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The two counterweights were nearly mirror images of each other, except for a small indentation in the starboard weight. Both counterweights featured a small cutout on their inner front corners to provide clearance for the aft turret lift hook. The weights are angled outward at approximately 45°. (Ward)

Recesses for the folding foul weather braces were cast into each counterweight. These braces and the three at the front supported a tarpaulin for keeping the turret crew dry. The socket for the .50 caliber (12.7mm) machine gun was mounted in the apex of the aft turret plates. Ready racks for 3 inch main gun rounds are fitted inside the aft turret walls. (Ward)



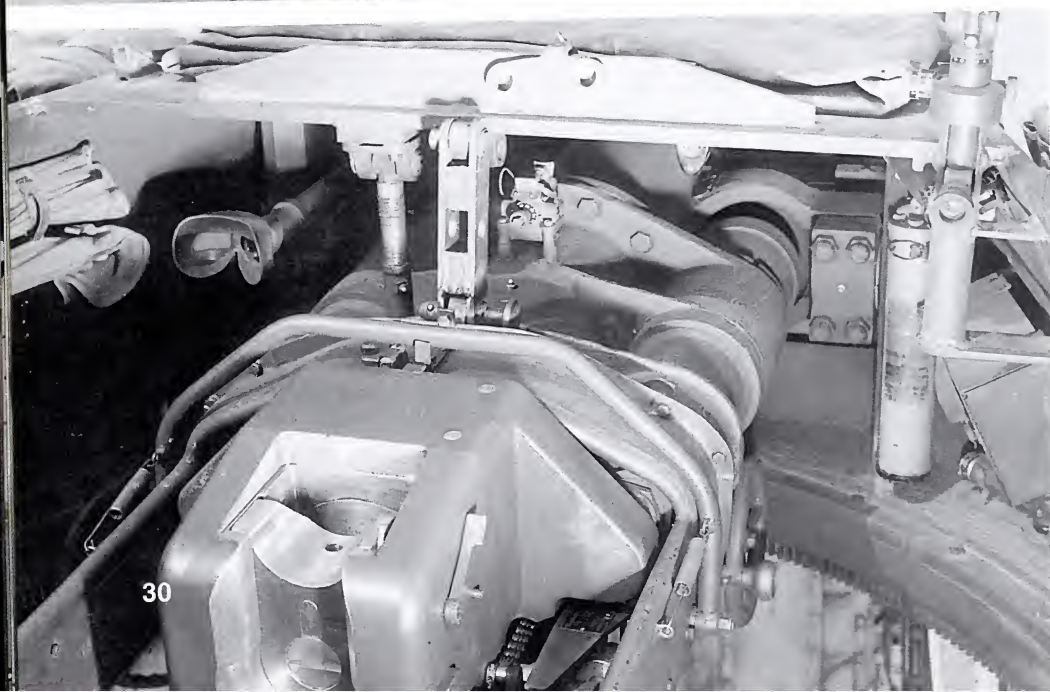
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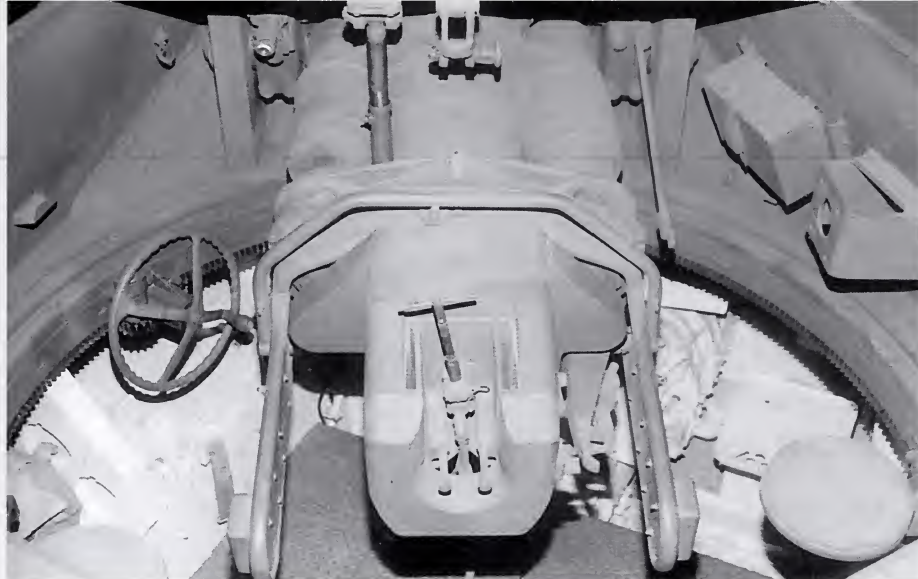
The machine gun mount was welded at the joint where the aft armor plates came together. The lift ring was mounted on the outside of the turret. Barely visible on the port counterweight is the embossed number E7993, which was its designation. The starboard counterweight was designated E7992. (Ward)



(Above) This late model M10 turret has the redesigned rear turret plate and the late 2500 pound duckbill counterweight. These were designated E8010 for the starboard weight and E8011 for port. The stamped number is located just behind the aft turret wall where the counterweight makes contact. Six 3-inch (76mm) ready rounds were carried in the turret on the rear wall, three on each side. A .50 caliber Browning M2HB (Heavy Barrel) machine gun is mounted on the turret rear for anti-aircraft and anti-surface target use. The canvas case for the signal flags is on the turret's far side. Canvas equipment bags are secured to the starboard turret side and a bag is placed inside the counterweight recess. (USA/NA)

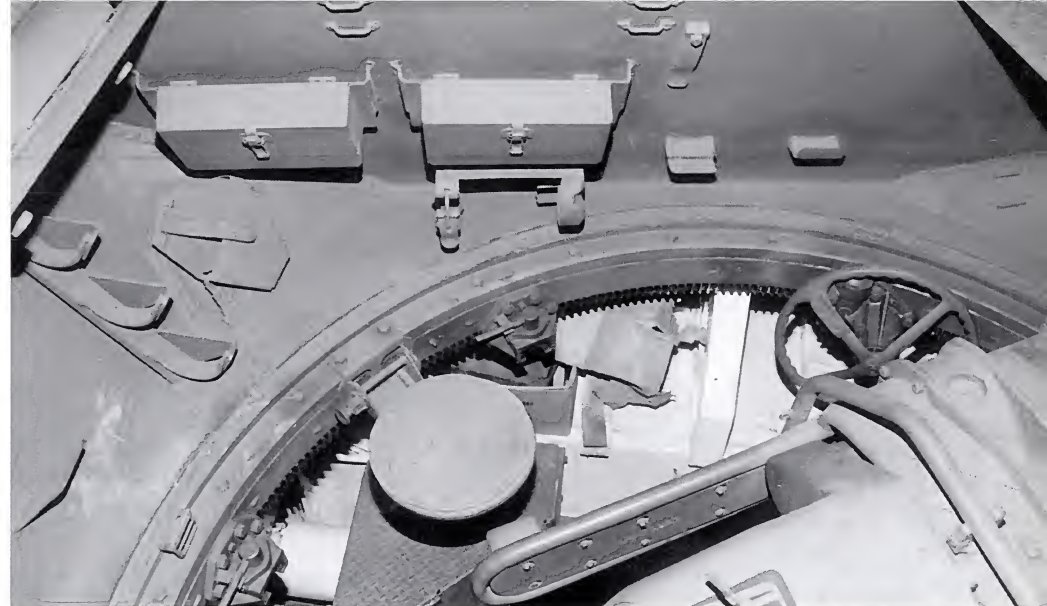
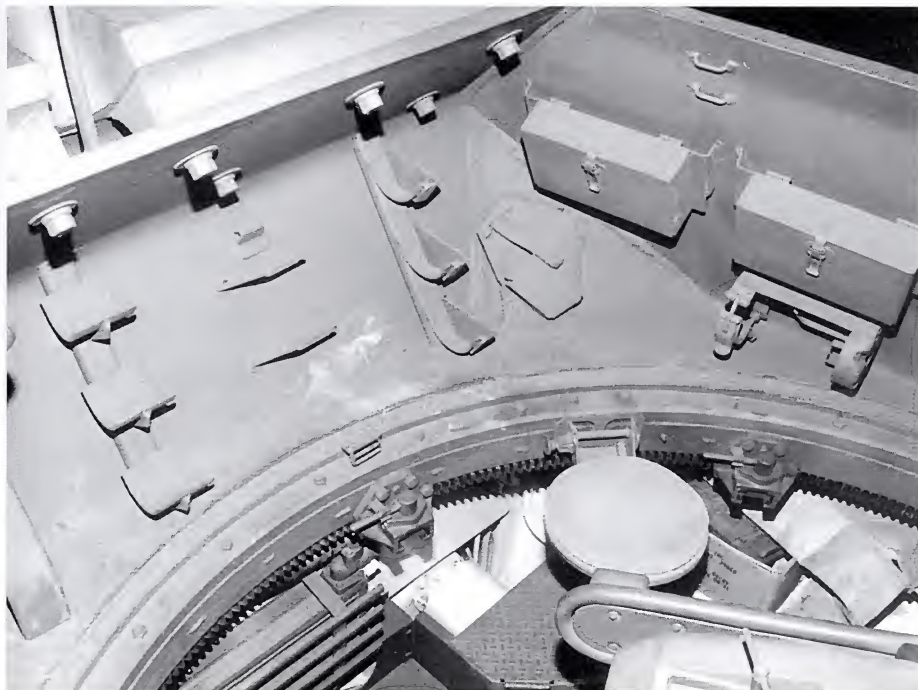


(Left) The M10 series was armed with the 3-inch M7 Gun, which fired various types of Armor Piercing (AP), High Explosive (HP), and smoke rounds. Muzzle velocity ranged from 900 feet (274.3 m) to 3400 feet (1036.3 m) per second, depending upon the type of round. Its maximum range varied from 2000 yards (1828.8 m) to 16,100 yards (14,721.8 m). The M7 had a maximum firing rate of 15 rounds per minute. The gunner's telescopic sight is mounted to port of the gun, while the panoramic artillery sight for indirect fire is on the starboard side. Above the breech is the travel lock that held the gun stationary when moving from one area to another. (USA/NA)



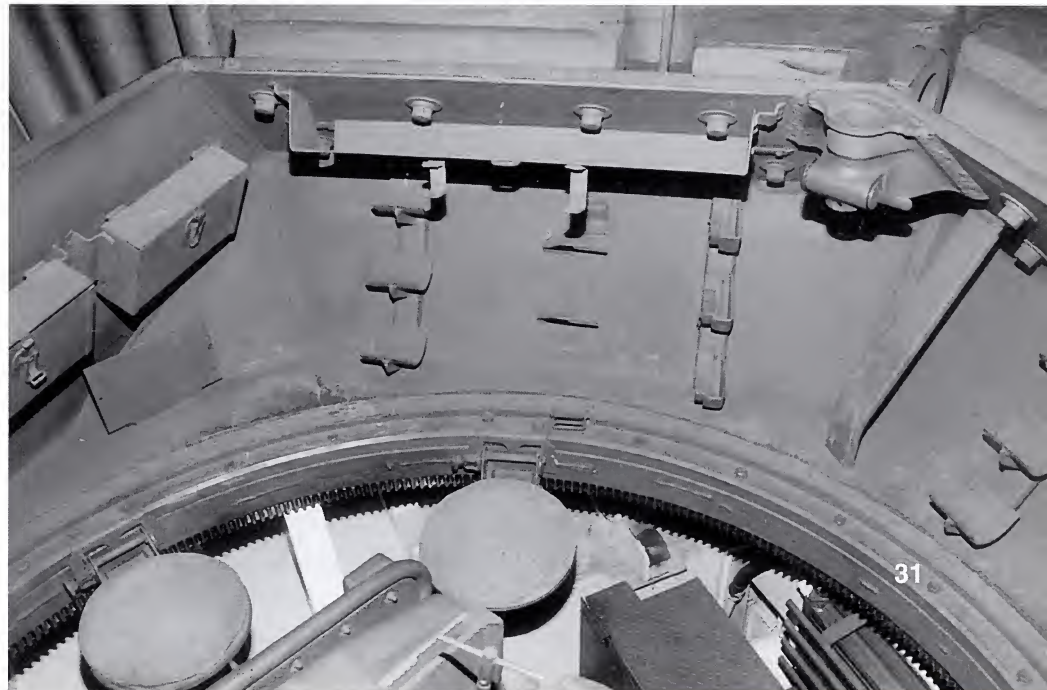
The 3-inch gun weighed nearly 2000 pounds (907.2 kg). Recoil cylinders were mounted on either side of the gun barrel, while recoil guards flanked the gun breech. The turret traverse wheel is mounted to port. M10s employed a manual traverse system; production ended before a successfully tested power traverse system could be added to the vehicle. (Ward)

The port aft turret wall had ready racks for the 3-inch ammunition. Directly below the racks on the turret ring is the locking mechanism that held the turret in place. Another locking mechanism is located on the other side of the seat. Bolts for attaching the counterweight to the turret are located above the storage racks. (Ward)



The gunner sat on a folding seat attached to the turret ring, which was 69 inches (175.3 cm) in diameter. Storage boxes and round fire extinguisher brackets are mounted to the port sidewall. The M10 turret interior was painted Olive Drab (FS34087) to match the vehicle's exterior color. (Ward)

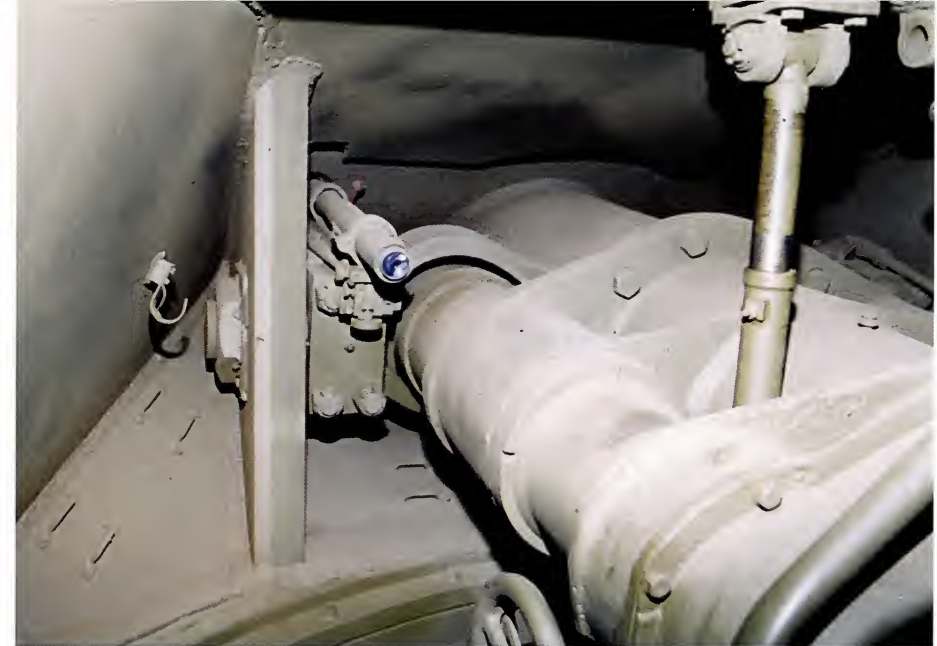
The right rear turret wall was similar to the left, but also had a box for .45 caliber (11mm) ammunition. An M3 sub-machine gun was normally clipped to the front of the ammunition box. Tank destroyer crews were issued a combination of .45 caliber Colt M1911A1 pistols, M3 sub-machine guns, and .30 caliber M1 carbines for personal defense. (Ward)





The turret's starboard side had additional storage boxes for ammunition, hand grenades, and other equipment. The empty bracket is where the panoramic artillery sight for indirect fire was mounted. The commander sat to starboard alongside the 3-inch gun, while the loader sat near the breech. (Ward)

The gunner had two wheels to move the gun and turret. A manual traverse wheel was mounted on the turret ring, while the manual elevation wheel was located on the gun mount. The traverse wheel turned the turret a full 360°. (Ward)



The gunner's M70G Telescopic Sight was mounted to port of the gun. Its eyepiece was normally fitted with a rubber shroud, which protected the eye and blocked glare. The M70G was used for aiming direct fire, including anti-tank engagements. The gunner lined up crosshairs inside this sight to determine the target's range. (Ward)

The elevation wheel raised or lowered the 3-inch gun from +30° to -10°. An electrical trigger button was set into a cup-shaped trigger guard and handle. This button was pushed on the commander's order to fire. (Ward)





The manual turret traverse wheel turned a gear that fit within gear teeth along the turret ring. One M10 was successfully fitted and tested with a hydraulic power traverse system, which proved much more efficient. M10s were never fitted with power traverse, due to the end of their production in late 1943. (Ward)

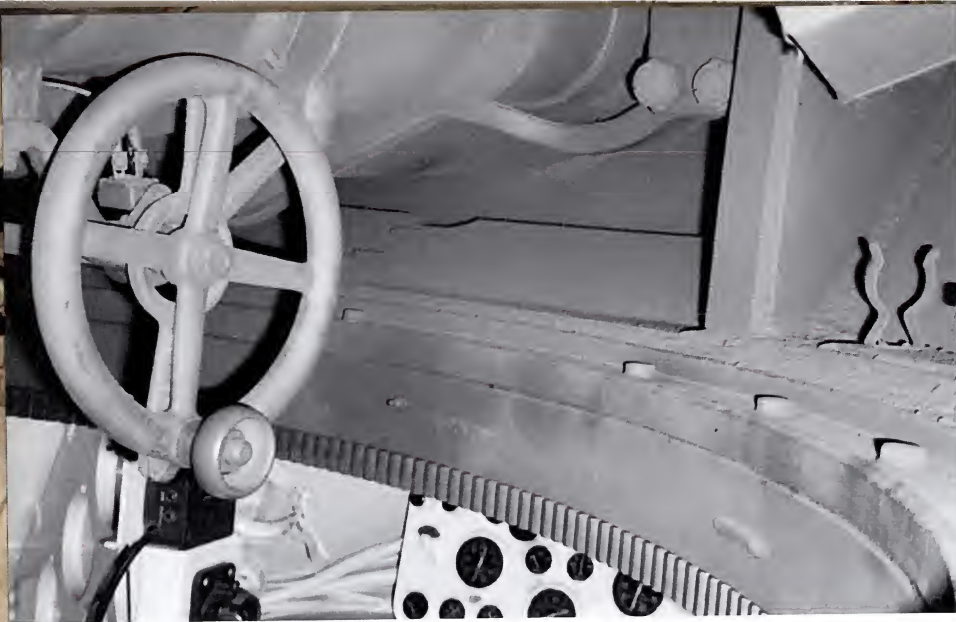
The breech was a semiautomatic, vertically sliding wedge. The gunner opened the breech and the loader placed a round into the chamber, then the breech was closed for firing. This M10 at the Patton Museum has had its breech removed and a simulator device for training fitted in its place.



The 3-inch gun breech had twin recoil guards mounted on either side. These provided limited protection from the recoil, which threw the breech aft some distance into the turret. The M10 turret was fairly roomy compared to that of the M4 Sherman medium tank on which it was based. (Ward)

The starboard side of the gun where the commander was stationed was fairly simple and relatively uncluttered. A panoramic artillery sight could be fitted on the bracket between the two storage boxes. The lid is open on the near storage box.





A second gun elevation wheel was mounted on the starboard side of the 3-inch gun. This wheel was identical to the one used by the gunner on the port side. The commander used this wheel in case the gunner was unable to use his wheel. The set of brackets to the right are believed to be a flashlight holder.

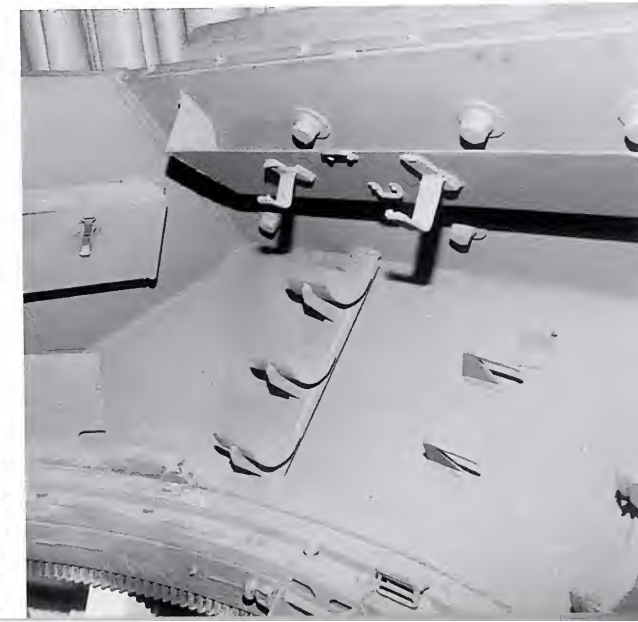
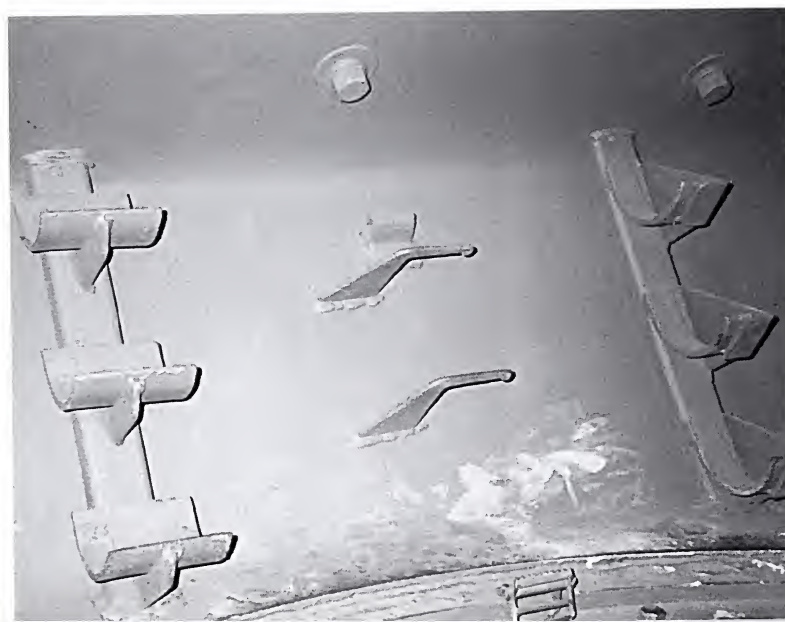
Each of the three turret crew seats folded into the upright position by pulling on the small knob on the seat bottom. This was held in place by a spring and locked in either the up or down position. Raising the seat slightly increased work space within the turret.

The turret's port and starboard aft walls held six ready rounds of 3-inch ammunition – three on each side. The rounds were laid in the racks (pointing to the vehicle's right side) and held in place by a canvas strap that ran over each case and hooked onto the L-shaped protrusion between the racks. The tie down points are visible above and below the 'L' fittings. The loader removed the rounds from these racks for loading into the weapon.



The M10's lack of a turret basket meant that the seats were attached to the turret ring and moved with the turret. This is the gunner's seat in the lowered position. The turret traverse locking mechanism is located to starboard on the turret ring. Brackets for a four pound (1.8 kg) carbon dioxide fire extinguisher are mounted immediately above the turret lock.

The starboard aft turret wall held a box and mount for a .45 caliber M3 sub-machine gun and 30-round clips of .45 caliber ammunition. These were located forward of the 3-inch ammunition ready racks. A strap to the tie down points between the brackets secured the M3 to the turret wall. (Ward)

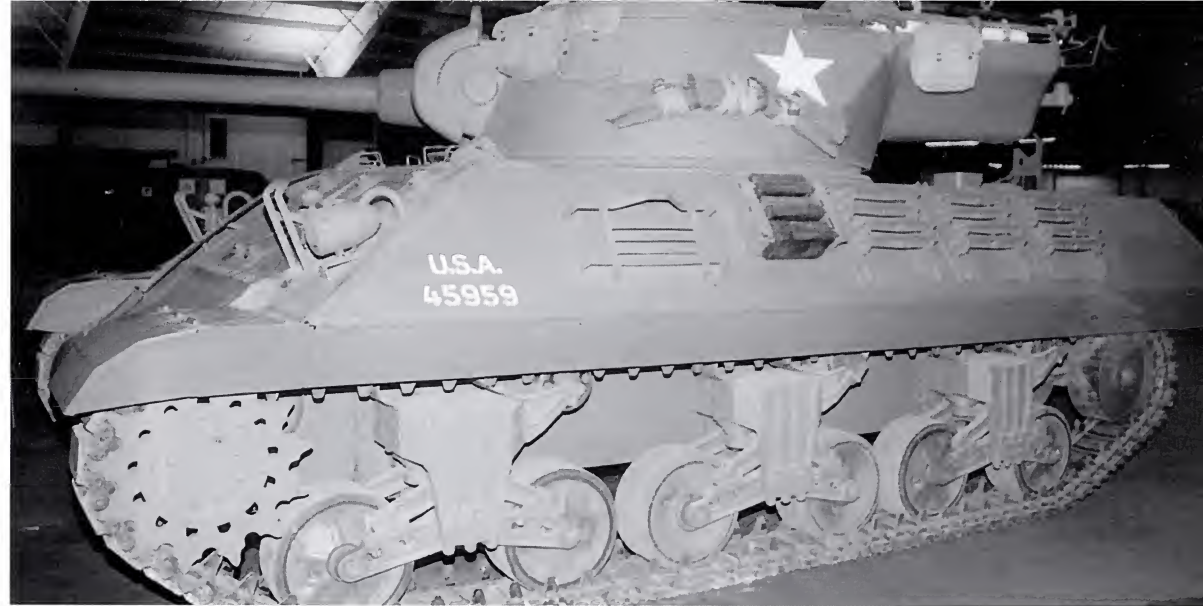
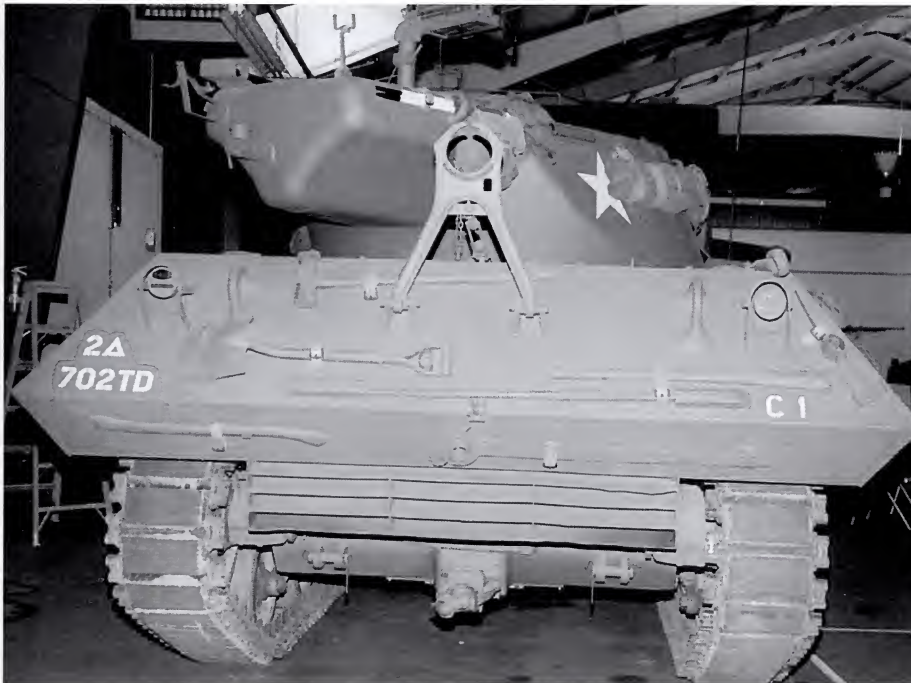


M36 Tank Destroyer



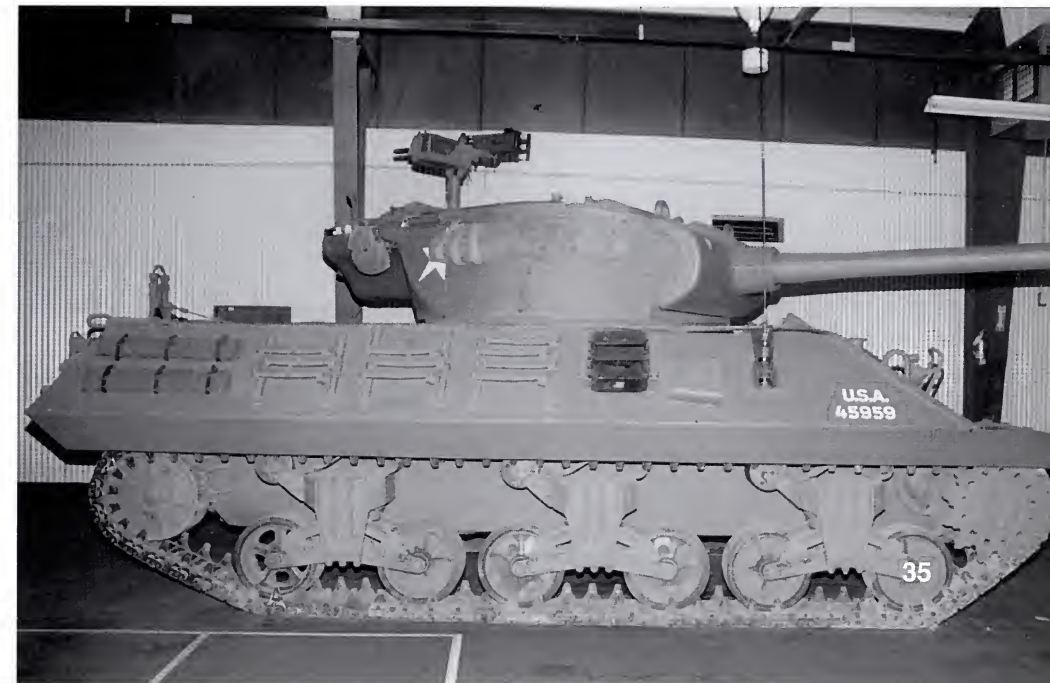
The M36 Gun Motor Carriage (GMC) was based on the M10A1 hull, but mounted a 90mm M3 gun in a newly designed turret. Aside from engine grill detail differences, the M36 hull was basically the same as the earlier M10. This vehicle is overall Olive Drab (FS34087), with white markings. (Ward)

The turret rear featured a massive bustle to balance the 2450 pound (1111.3 kg) 90mm gun. A different type of folding barrel brace was used, which altered the tool storage on the M36's rear hull. Artillery aiming stakes are strapped to the starboard turret side. Markings on the lower port hull indicated 2nd Armored Division, 702nd Tank Destroyer Battalion. (Ward)



The new turret was more rounded in appearance and featured a rounded mantlet compared to the angular unit on the M10. The forward storage rack and track holder were commonly seen on the M36, along with the grouser racks toward the aft hull sides. The M36 was 24 feet 5.9 inches (7.5 m) long, ten feet (3 m) wide, and 10 feet 9 inches (3.3 m) tall. This is 2 feet 0.9 inch (0.6 m) longer and 1 foot 3 inches (0.4 m) taller than the M10. (Ward)

The starboard side of the hull was similar to the port side, except for a first aid kit in place of the storage rack and the antenna mount for the SCR 610 radio. This M36 features three different styles of road wheels – open spoke wheels, open spoke wheels with blanking plates, and stamped spoked wheels. All three road wheel styles were used on M36s during its service career. (Ward)





In late 1944, the need for more M36s resulted in Fisher mounting M36 turrets onto 187 M4A3 Sherman tank hulls. The resulting vehicles were designated M36B1s. This M36B1 displayed at Fort Hood, Texas has a muzzle brake and fume extractor added to the M3A1 gun barrel. The muzzle brake reduced the amount of smoke and dust raised after firing, while the fume extractor kept gun gas out of the turret. (Phillips)

The massive counterweight at the turret rear was five inches (12.7 cm) thick in some places. Eleven rounds of 90MM ammunition were stored within the bustle, while the other 36 rounds were placed within the hull sponsons. (Phillips)



The M36B1 was the only American tank destroyer to be armed with a hull-mounted machine gun, the .30 caliber (7.62mm) Browning M1919A4. It was retained from the standard M4A3 tank. This extremely rare vehicle at Ft. Hood is missing many of its external fittings, but is in otherwise fair shape. (Phillips)

The M36 turret was fitted to the M4A3 hull with only slight modification. The hull interior needed some rearrangement to accommodate the larger and longer 90mm rounds. Aside from these changes, nothing else was necessary for the M36B1 conversion. (Phillips)





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Some M36s had a specific bracket for holding the tow cable, which was normally attached to the tow eyes on the lower transmission housing section. The latch was unscrewed and flipped open to hold the cable housing end. Tow cables were used in pulling disabled vehicles and equipment in emergency situations. (Ward)

A small medical kit container was mounted on the starboard hull side just behind the radio antenna mount. Pushing the clasp forward released the retaining clamp from around the U-shaped lip on the container's top. This item appeared on late production M36s.



A special bracket was mounted for the foul weather hood storage on the port forward hull. It was composed of welded metal strips and was welded to the hull. The hood was folded and placed within the bracket when not in use. (Ward)

(Below) Inside the container was a standard first aid kit for emergency use only. A second kit was located inside the vehicle by the driver's position. (Ward)



(Right) Apart from basic first aid supplies, the lid also contained instructions on how to give first aid. It also showed how to deal with other problems such as carbon monoxide poisoning, electrical shock, and artificial respiration. (Ward)





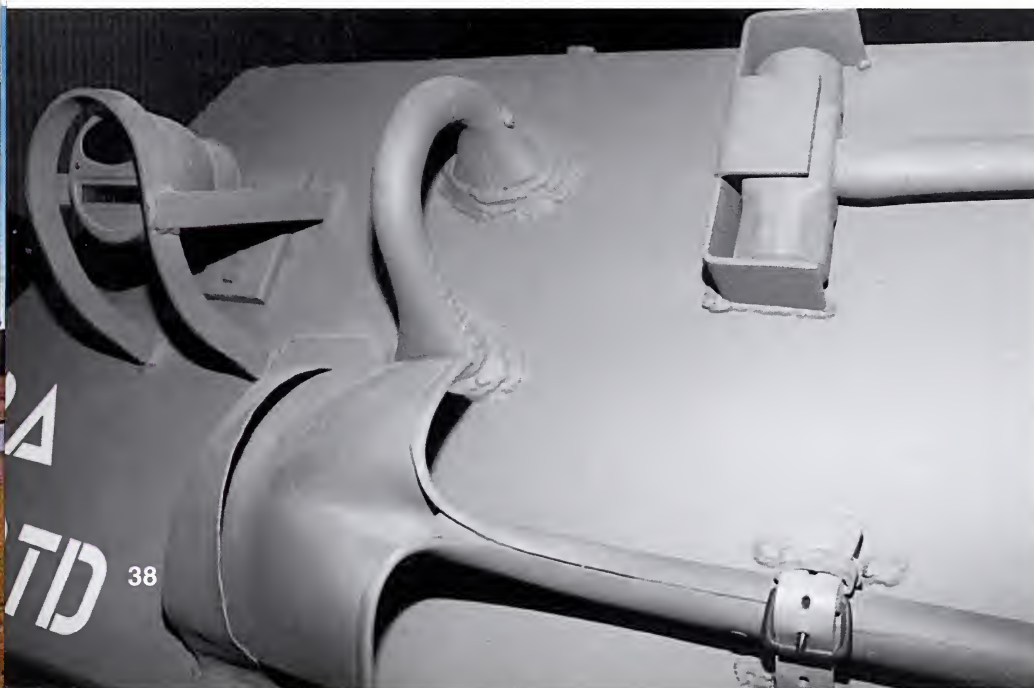
Spare track block holders like those found on the rear of M4s were often mounted on the starboard side of M36s. These holders were hinged at the bottom and swung open when the wing nuts at the top were released. The M36's track types included the T51 rubber track blocks loaded on this vehicle. (Ward)

The aft hull stowage points were somewhat different than on the M10, due to the new barrel travel brace. The sledge hammer head was fitted into a rectangular bracket, while the shovel head sat in an oval shaped bracket. Each was held in place by a leather strap (out of view for the hammer). (Ward)



Identification panel containers – used to mark positions for friendly aircraft – were mounted on the starboard aft hull side. Each canvas container holds a different color and is labeled accordingly, the top one being red, while the bottom is yellow. Headquarters secretly decreed the color for an operation to foil enemy intelligence. (Ward)

The axe head sat in a rectangular bracket on the lower part of the left rear hull, while its handle nestled in a small L-shaped bracket. A leather strap secured it to a tie down point. Just under the shovel tie down is an oblong bracket holding the pry bar handle. (Ward)





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The track tension adjustment wrench was mounted on the lower aft hull. The wrench head sat over a round bracket and was held in place by a chained pin to keep it from being lost. The pry bar and pickaxe are mounted on the aft hull's upper section just above this wrench. All are held in place by leather straps. (Ward)



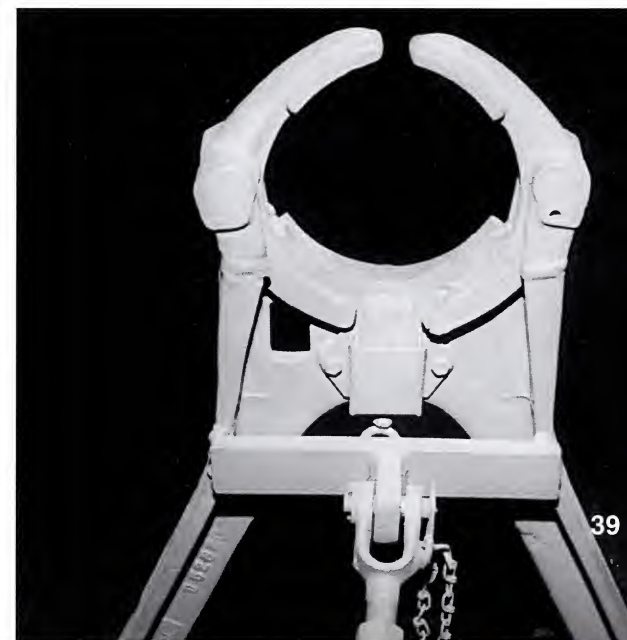
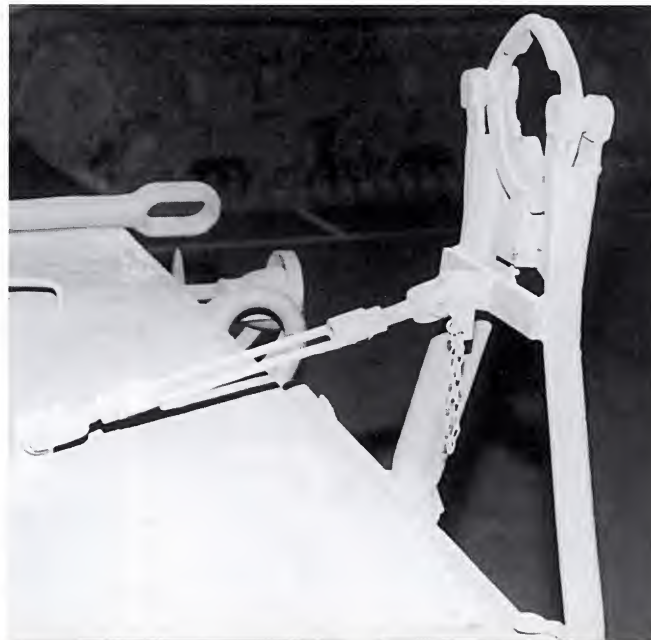
The pickaxe head was mounted on the far right side of the upper aft hull, near the taillight. The pick's blunt end sat in an open-ended bracket, while the handle opening rested over a round bracket. The customary leather restraining strap held the pick head in place. (Ward)

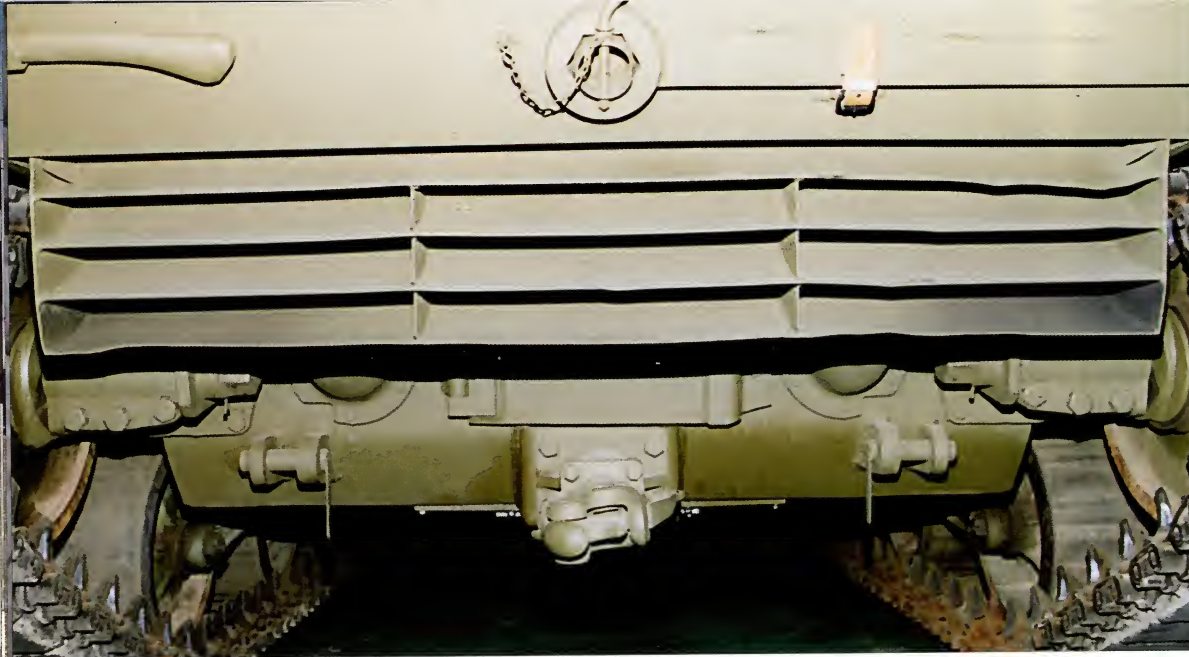
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The new barrel travel brace was mounted in the center of the aft hull plate. Unlike the M10's simple fixed cradle, the M36 unit was hinged to swing up or down. The small ring under the clamp's bottom opens or closes the clamp jaws when pulled. (Ward)

A secondary strut locked the travel brace in place, while the barrel was clamped into the cradle. This prevented the barrel from moving and possibly jarring the gun out of alignment. This brace was employed when the M36 was making extensive trips away from the combat area. (Ward)

Pulling the small ring closed the jaws of the clamp over the gun barrel. It was laid into the cradle and the jaws closed over the barrel to secure it. Pointing the 90MM gun aft reduced the M36's overall length by six inches (15.2 cm). (Ward)





The M36 featured a different exhaust baffle compared to the duct on the earlier M10. It consisted of a series of louvers that deflected hot exhaust gases away from the aft hull. This resulted in extensive soot coverage of these louvers, which is not apparent on this restored vehicle. The bottoms of both exhaust covers are visible just above the tow brackets. (Ward)

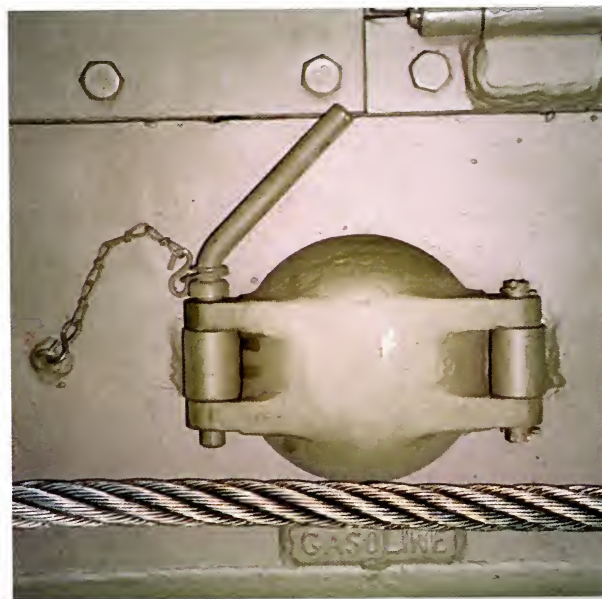


The cast exhaust outlet exited the lower aft hull plate and angled up before bending aft and flattening into a slot. Both the exhausts and engine bay cooling fans ducted through the louvers mounted on the rear hull. These louvers allowed cooler air to reduce the exhaust gas temperature once it leaves the vehicle.

Four armored fuel covers were mounted on the engine deck. The covers were hinged and locked down using a small bent pin chained to the engine deck. The M36's fuel tanks had a capacity of 192 gallons (726.8 L). (Ward)

The pin was secured to the hull by a chain to prevent its loss. A small welded plate adjacent to the cover indicated the contents of the tank. The M36's Ford GAA engine burned 80-octane gasoline, instead of the diesel fuel used by the M10's GM 6046 powerplant. (Ward)

The top of the fuel tank – and a second cap – were under the armored cover. This simply unscrewed like a standard car or truck fuel cap. Tow cable brackets were mounted on the outer edge of the hull and engine decks. (Ward)





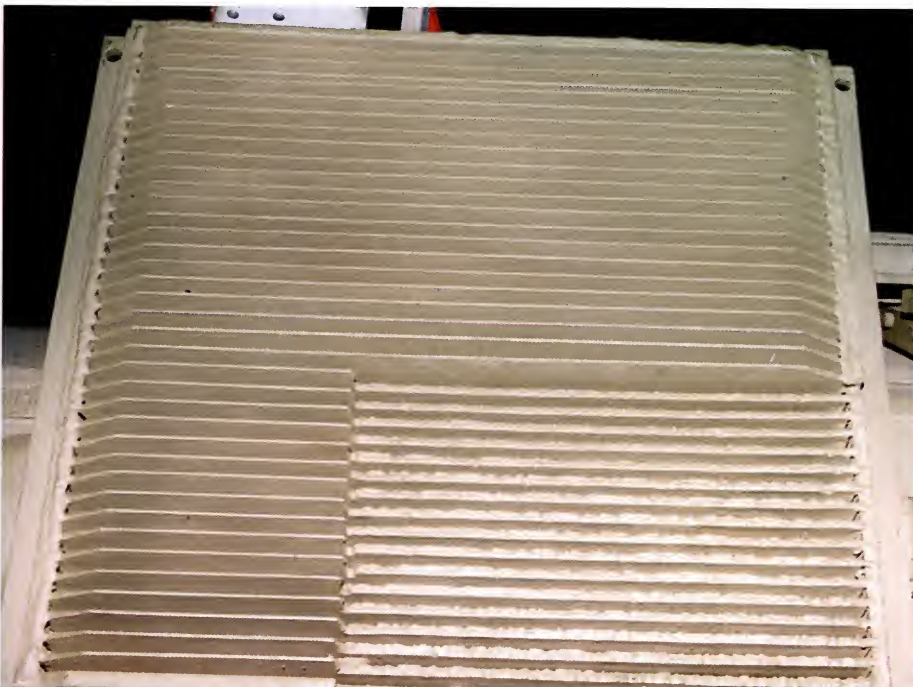
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The last cable bracket was mounted at the right rear corner of the hull. A hinged bracket near the cable head was held shut by a pivoting bolt and wing nut. This enclosure allowed the crew to easily remove the cable when needed, yet provided a secure fastening to the vehicle when not needed. (Ward)

The underside of the grill featured louvers that ran the width of the grill. Some louvers have been reduced in depth to clear part of the engine. Two bolt holes used in securing the grill to the engine deck are located on the outer edge near the inboard side. (Ward)

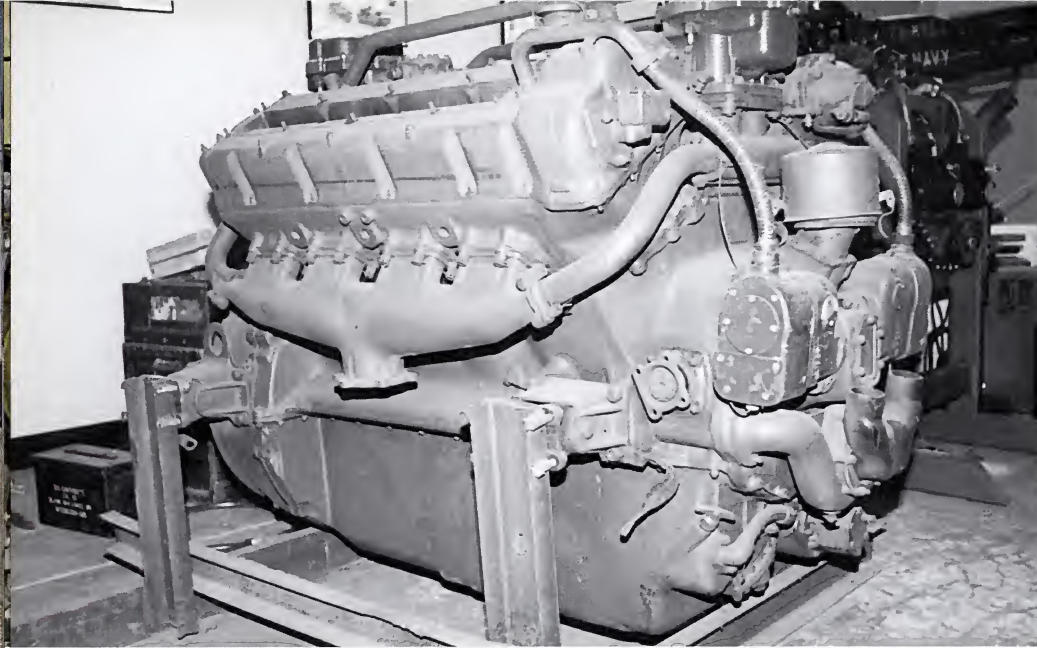
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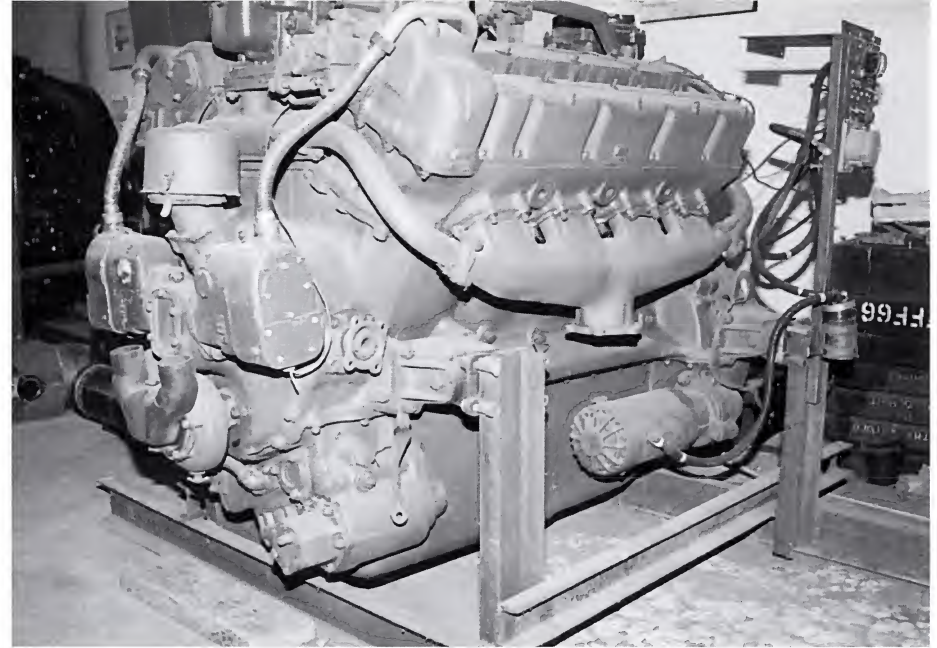
The M36 was based on the M10A1 hull and had a much wider engine deck grill than the standard M10. These grills were hinged on the side and opened outward for engine access. External air flowed in through the grill to help prevent engine overheating. (Ward)

The forward left side of the M36 engine deck featured the same type of twin fire extinguisher handles like those found on the M10. These handles were mounted perpendicular to the hull side, rather than at an angle on the M10. Both handles are painted red for easy identification. (Ward)





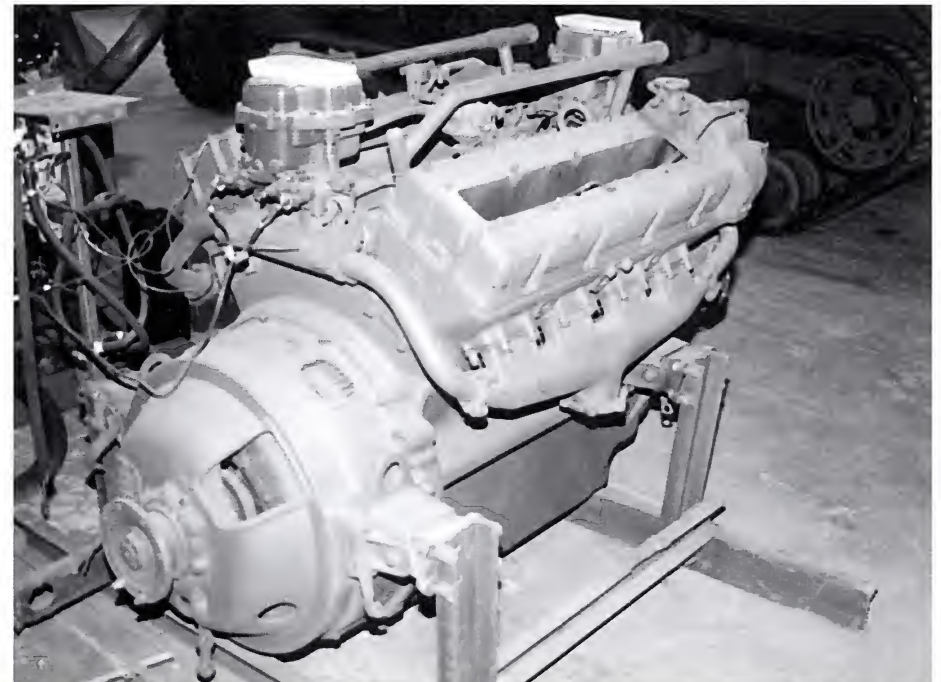
The M36 was equipped with a 500 horsepower (HP) Ford GAA eight-cylinder, liquid cooled engine. This powerplant used 80-octane gasoline, which is more volatile than the diesel fuel used on the M10. The GAA weighed 1560 pounds (707.6 kg) in a dry condition.



The starter motor was mounted on the engine's lower starboard side. The long rectangular cover is the camshaft housing cover, with the exhaust manifold immediately below it. The GAA had a displacement of 1100 cubic inches (18,026 cm³).



The twin coolant pipes at the bottom go into the water pump at the rear of the engine. The magnetos used for ignition are immediately above and to the side of these pipes. The cylinder centered above the magnetos is the crankcase air breather. The warm air duct leading from the exhaust manifolds to the carburetors is behind the breather. There was an identical pipe on the other end of the engine.

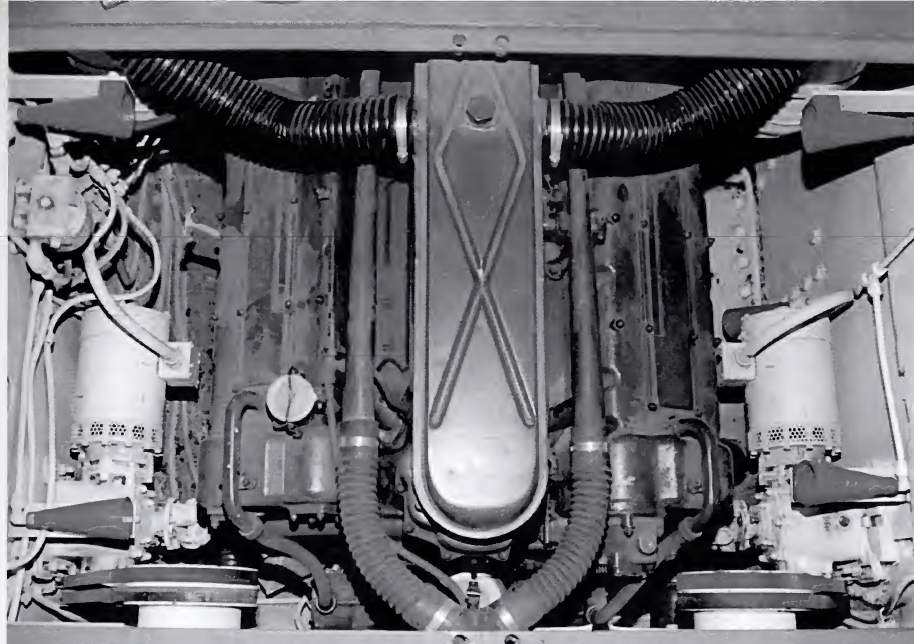


The clutch housing is the small circular fitting on the lower left, with the clutch release arm directly below it. Behind the clutch housing is the clutch flange, which is connected to the drive shaft. An oil pan was mounted on the bottom of the engine. The engine oil system held 32 quarts (30.3 L) of oil.



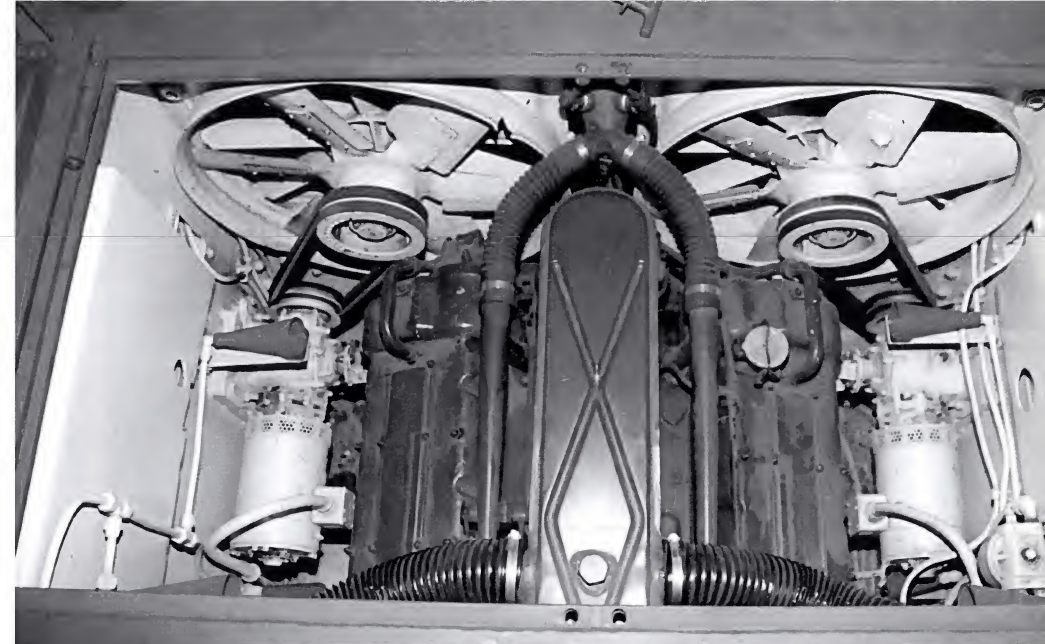
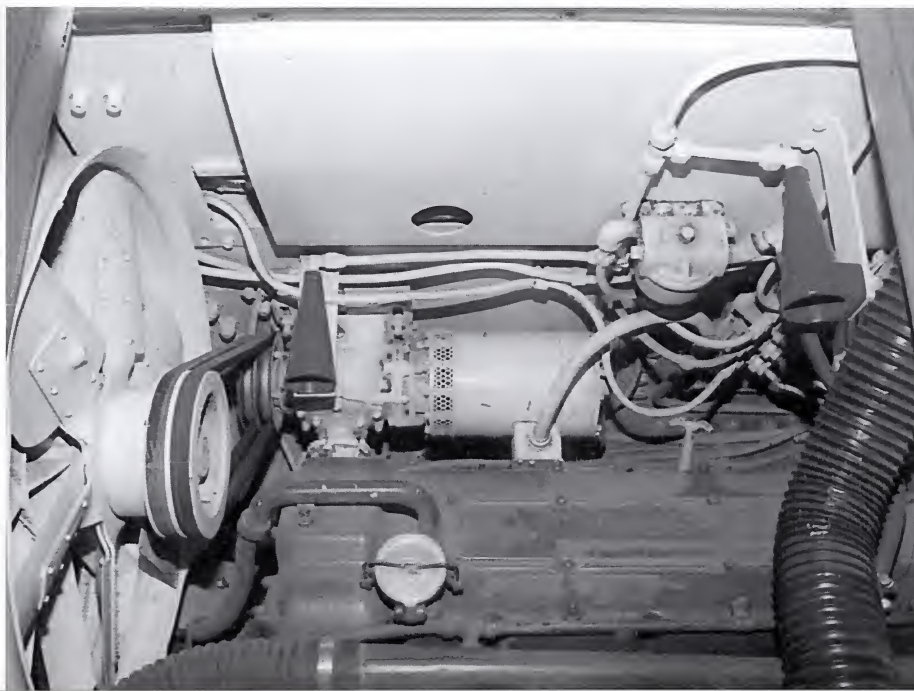
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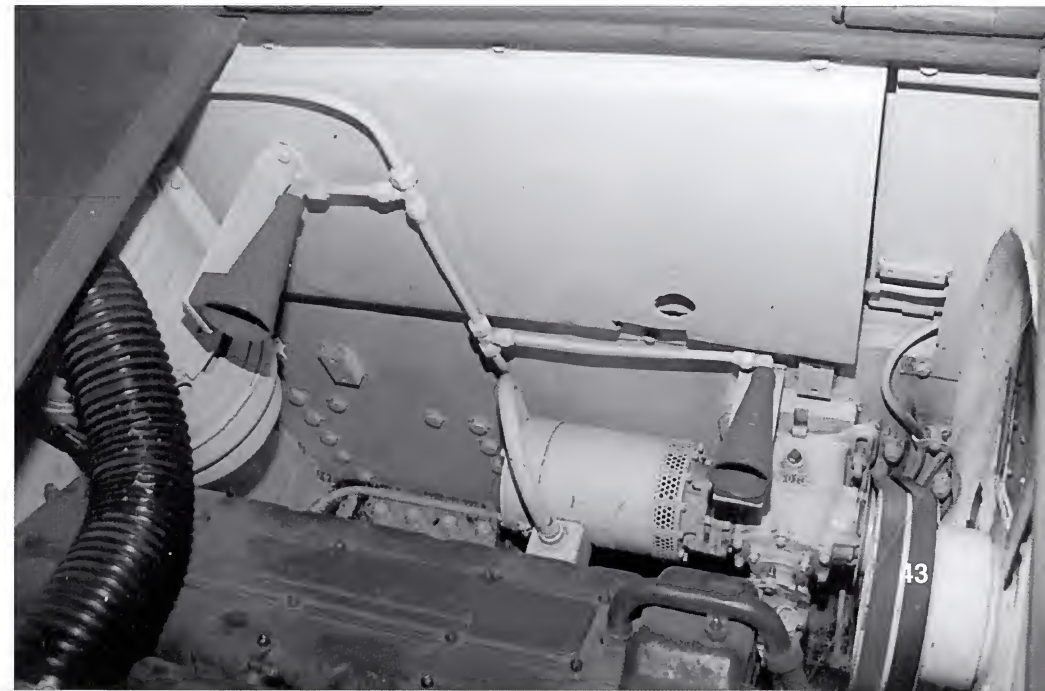
The M36 engine compartment was similar to that of the M4A3 tank. The air intake manifold is mounted atop the engine, with air hoses running into it from the front of the compartment. Conical fire extinguisher nozzles are directed against the carburetors and the bottom of the engine bay. (Ward)

Each engine compartment fan – including this one on the port side – was driven by a differential unit. It was connected to the engine accessory drive via a lateral drive shaft. A 30-volt generator was also mounted behind each fan. An oil filler cap was mounted atop the engine cylinder case. (Ward)



Two large fans at the rear of the engine compartment pulled air in through the grills to cool the engine. Hot air was drawn through the coolant radiators behind the fans. The Y-shaped pipe running between the fans carries engine coolant to the radiators. (Ward)

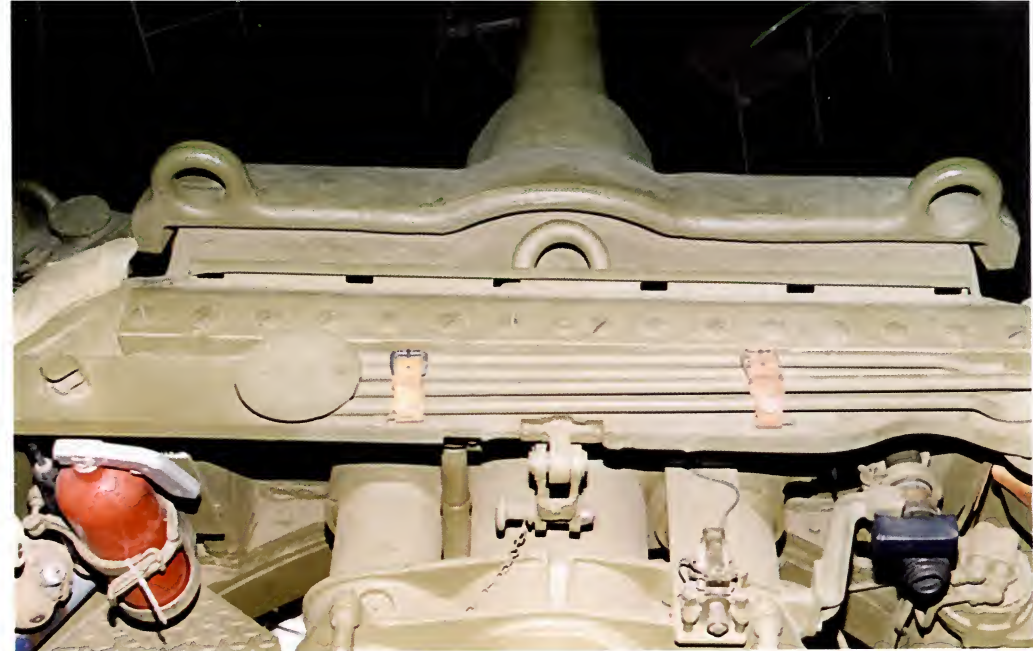
Fire extinguisher nozzles were mounted at different heights on the engine bay sidewall. A third nozzle was mounted lower and aimed at the bottom of the engine. This starboard side pattern was repeated on the other side, which resulted in complete engine bay coverage in the event of fire. (Ward)





The M36 featured a new turret and rounded mantlet compared to the earlier M10. A collar surrounding the gun was integrally cast with the mantlet. This mantlet was also three inches (7.6 cm) thick, an increase over the 2.25 inch (5.7 cm) thickness of the M10 mantlet.

The gun trunnion was mounted on steel plates welded to the main turret. The rolled turret armor plate was more rounded in appearance than the M10's angular profile. Two canvas equipment bags are fastened to the upper turret edge. (Ward)



Two lift rings were cast into the mantlet's upper edge. Another ring was welded to the gun cover behind the mantlet. Three foul weather top support poles are fastened to the forward edge of the turret. (Ward)

A rail for carrying packs and other types of gear was mounted along the upper edge of the turret side. Additionally, there were numerous tie downs to hold extra equipment that could not be carried inside the vehicle. The M36 turret side armor was 1.25 inches (3.2 cm) thick, compared to the one-inch (2.5 cm) thickness of the M10. (Ward)





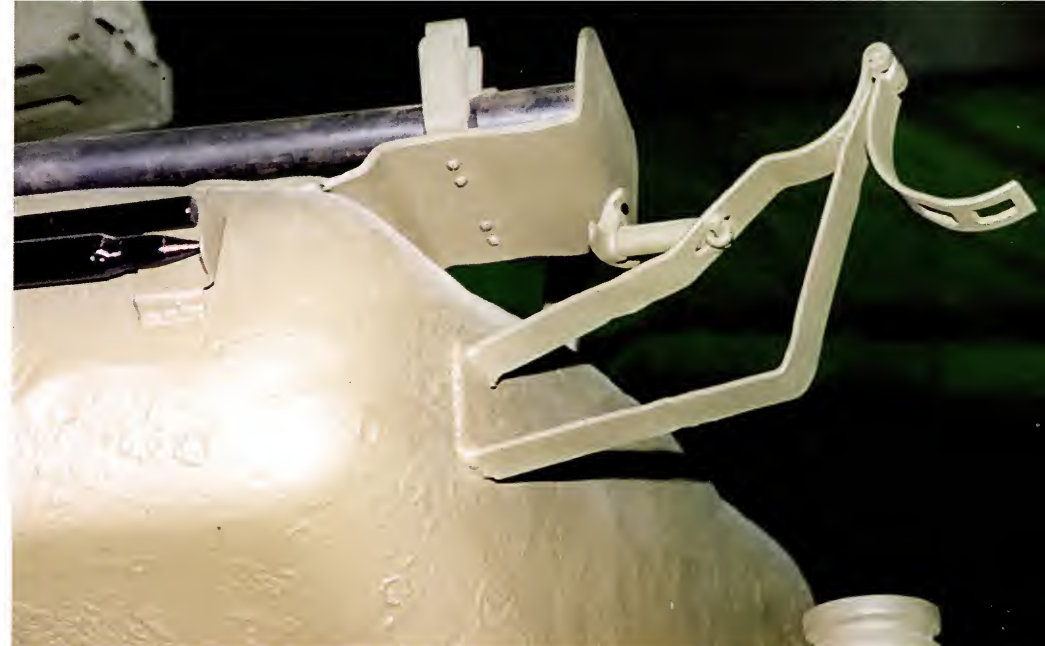
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A massive armored bustle was welded to the turret rear to help balance the large and heavy 90mm M3 gun. In some places, it was up to five inches (12.7 cm) thick. Storage mounts for the .50 caliber (12.7mm) M2HB machine gun were welded to the back of the bustle. (Ward)

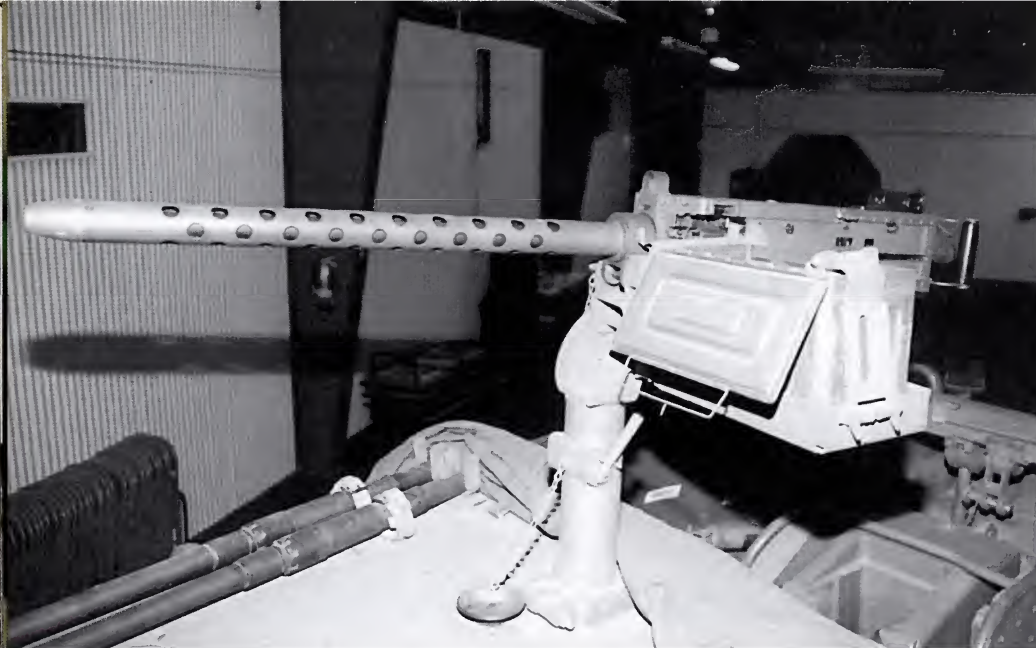
Two extra machine gun barrels were stored in this rack along the left edge of the bustle roof. Red and white striped artillery aiming stakes were stowed on the left side. These stakes were set into the ground ahead of the vehicle when the tank destroyer was employed in the indirect artillery fire role. (Ward)



This bracket held the cooling jacket of the disassembled .50 caliber machine gun when stowed. The barrel was removed and clamped into a bracket atop the bustle. Spare barrel jackets were carried to enable the crew to change them in the field. (Ward)

A mount was welded to the bustle rear for the .50 caliber machine gun and its cradle. It was locked in place by a lever handle on the port side, which protrudes from the bottom. An equipment bracket is mounted above and left of the machine gun mount. (Ward)





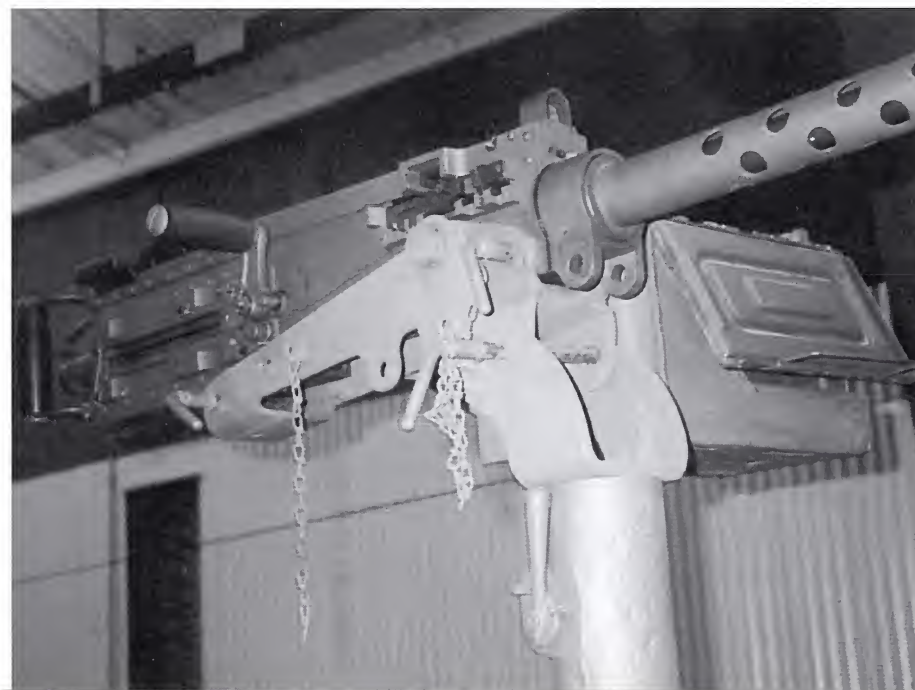
A .50 caliber Browning M2HB (Heavy Barrel) machine gun was mounted atop the bustle just behind the open topped turret compartment. This weapon was used in both the air and ground defense role. The ammunition was belt fed from a box mounted on the gun's left side. The barrel is surrounded by a perforated cooling jacket. (Ward)

An L-shaped pin secured the weapon in its cradle. When inserted, the pin went through a small V-shaped fitting under the receiver assembly. A similar fitting is located just behind the cradle. The M2HB's cyclic rate of fire was 500 rounds per minute and its muzzle velocity was 2950 feet (899.2 m) per second. (Ward)



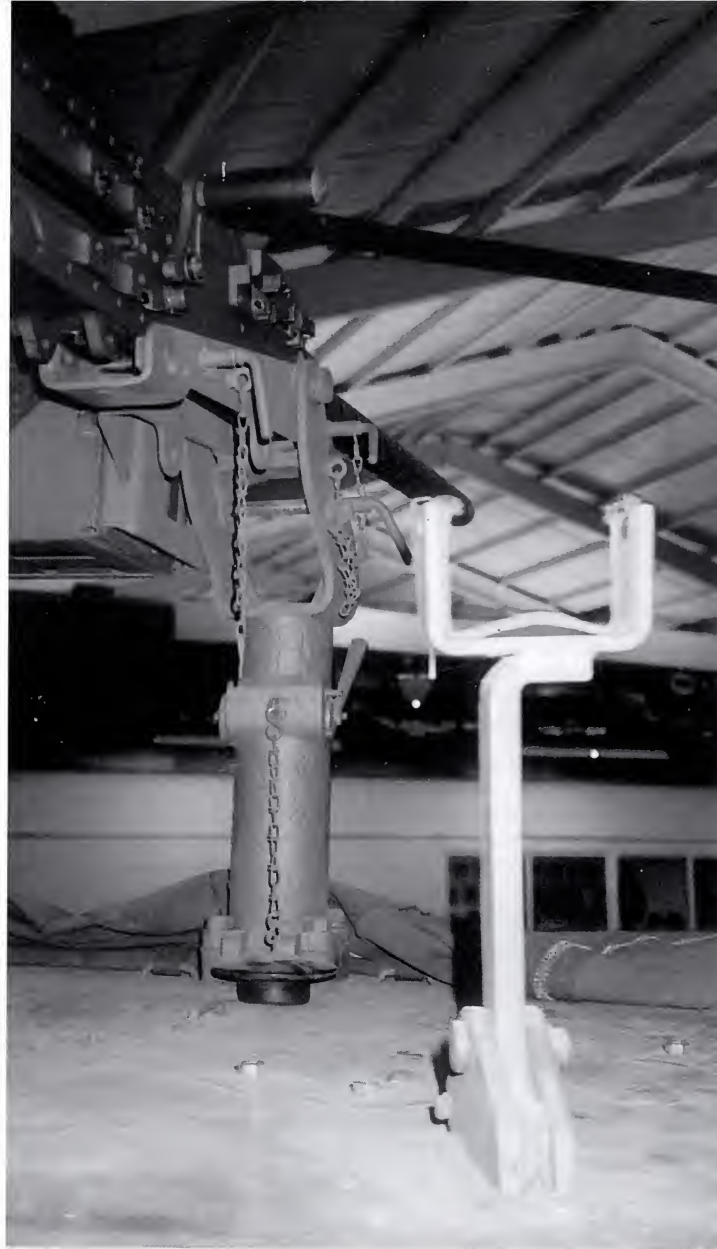
The ammunition box held 105 rounds, which were usually a mix of armor piercing, incendiary, and tracer rounds. This box was mounted in a tray attached to the machine gun cradle and held in place by a spring-loaded clamp on the end of the tray. The M36 was supplied with 1000 rounds of .50 caliber ammunition. (Ward)

The cradle was attached to the pintle mount by another L-shaped pin. A second pin holds the barrel in the cradle next to the ammunition box. Spent rounds were ejected out the right side of the weapon. (Ward)





The pintle for the .50 caliber machine gun was bolted to a plate, which was welded to the bustle. This plate was hinged to allow it to be lowered for storage purposes. The side lever locks the swivel portion of the mount in place for road travel. A small cap chained to the post covered the hole when the mount was removed. (Ward)



A barrel travel lock was located behind the gun mount to hold the machine gun in place when in the traveling position. This prevented the weapon from freely moving around on its mount when the vehicle turns or negotiates hilly terrain. The .50 caliber M2HB had full 360° traverse for engaging targets in the air or on the ground.



A clamp was normally housed in the U-shaped bracket to hold the barrel in place. The entire bracket could be lowered for storage purposes by moving the small lever between the V-shaped flanges welded to the bustle. (Ward)



The M36 was armed with a 90MM M3 gun in an open topped turret. The loader's station is to port, while the gunner sat to starboard – a reversal of the M10's layout. The platform below the fire extinguisher was not normally found on later production vehicles. (Ward)

The loader sat to the left of the gun on a seat attached to the turret ring, which measured 69 inches (175.3 cm) in diameter. The driver's seat and transmission housing are located below and in front of the loader's position. (Ward)



The seated folded up for storage or when the crew needed to move around the turret freely. Unlike the M10, the M36 had a partial turret basket on the starboard side under the gunner and commander. (Ward)



Eleven rounds of 90MM ammunition were stored in the turret's armored bustle. Canvas covers protected the rounds from the elements. The square gunner's seat is at left, just in front of the barely visible commander's seat. Depending upon the round fired, the M3 gun had a muzzle velocity between 2650 feet (807.7 m) to 3350 feet (1021.1 m) per second. Maximum range varied from 15,700 yards (14,356.1 m) to 21,400 yards (19,568.2 m). (Ward)

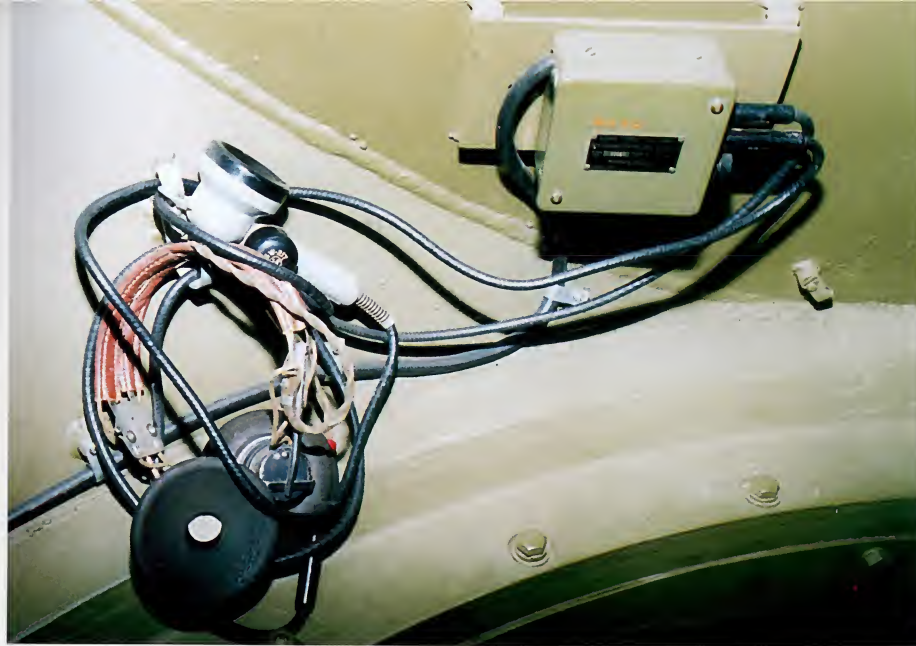
The side of the turret held (from right) a four pound (1.8 kg) carbon dioxide fire extinguisher, a decontamination unit, tie downs for canteens and other gear, and a flashlight bracket. The round object at left is a cord reel for the headlight, which could be unhooked for separate use as a spotlight. (Ward)





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An intercom control box was mounted on the turret's port rear quarter. Each crew member had his own set of headphones to communicate with the other crewmen. These headphones were worn under the standard US Army leather crash helmet, although turret crews later wore the M1 steel helmet issued to US troops. (Ward)

The starboard bustle ready rack held six 90mm rounds. Canvas covers zipped all the way around the bin and completely enclosed the rounds. Spring-loaded arms held the rounds in place until the loader pulled them out. (Ward)



Two 90mm ammunition ready racks were mounted in the turret bustle. The racks were enclosed by sheet metal and zippered canvas covers to protect the rounds from moisture and dirt. A canvas covered canteen is secured near one of the ready racks. (Ward)

The port rack held five rounds, which were held in place by a small flange. This flange was held up by a spring type lever on the side of the rack. The M3 gun fired armor-piercing, high explosive, and smoke rounds. (Ward)



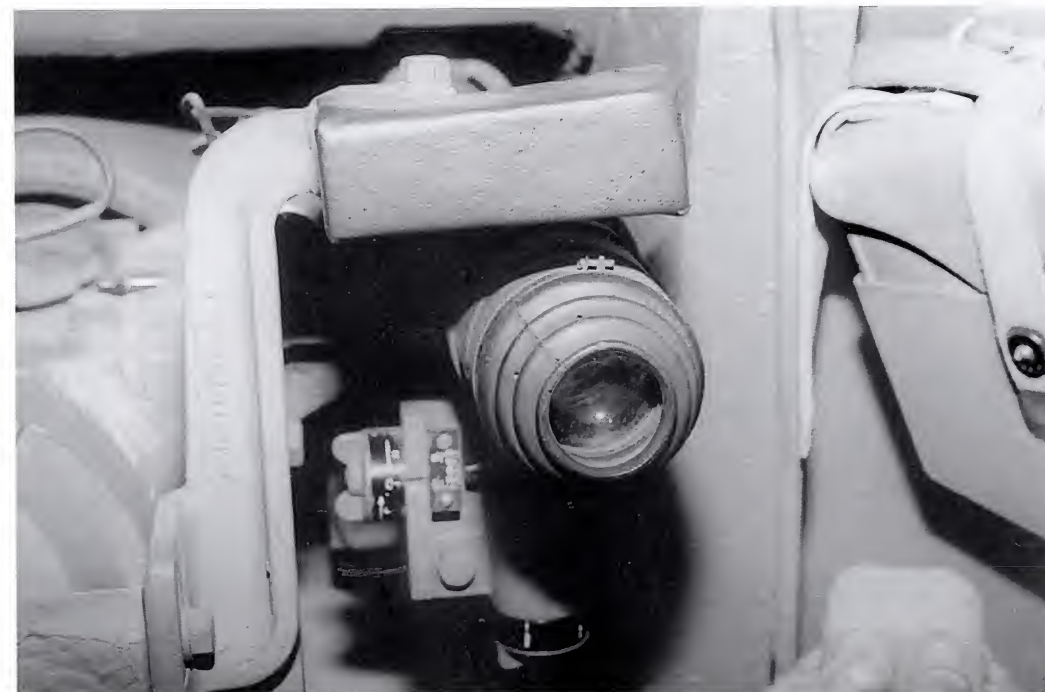


The 90mm rounds for the M36's M3 gun were large and heavy, weighing between 15.4 pounds (7 kg) and 27.2 pounds (12.3 kg). This weapon proved capable of destroying the new German Panther and Tiger tanks being encountered and was superior to the M10's 3-inch (76mm) M7 gun and the M4 Sherman's 75mm and 76mm guns. (Ward)



The gunner sat on the starboard side of the M36 turret. His M76D Telescopic Sight for direct fire is located just to the right of the 90mm gun. The panoramic telescope is to starboard, while the hydraulic and manual traverse system is mounted below the sight. The turret traversed the full 360° in 15 seconds. (Ward)

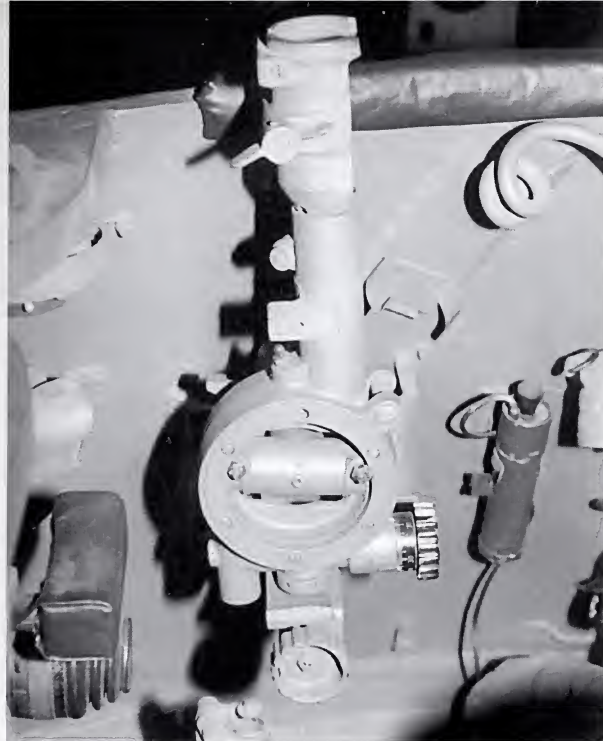
The gunner's sight had a small pad above it to protect his forehead. This was a direct sight system and gave the gun a maximum effective range – using armor piercing ammunition – of approximately 2000 yards (1828.8 m). Normal combat range was usually closer to 500-1000 yards (457.2-914.4 m). (Ward)





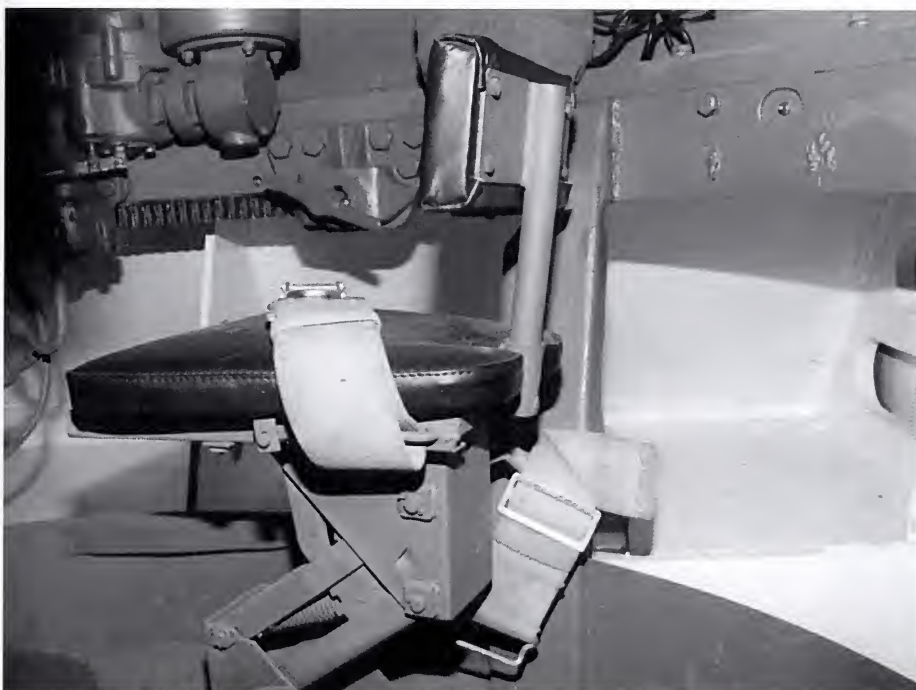
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Besides its normal direct fire role, the M3 gun was also used for indirect fire support. The gunner used an indirect panoramic sight mounted on a bracket on the turret side. This sight is missing some of its components. (Ward)

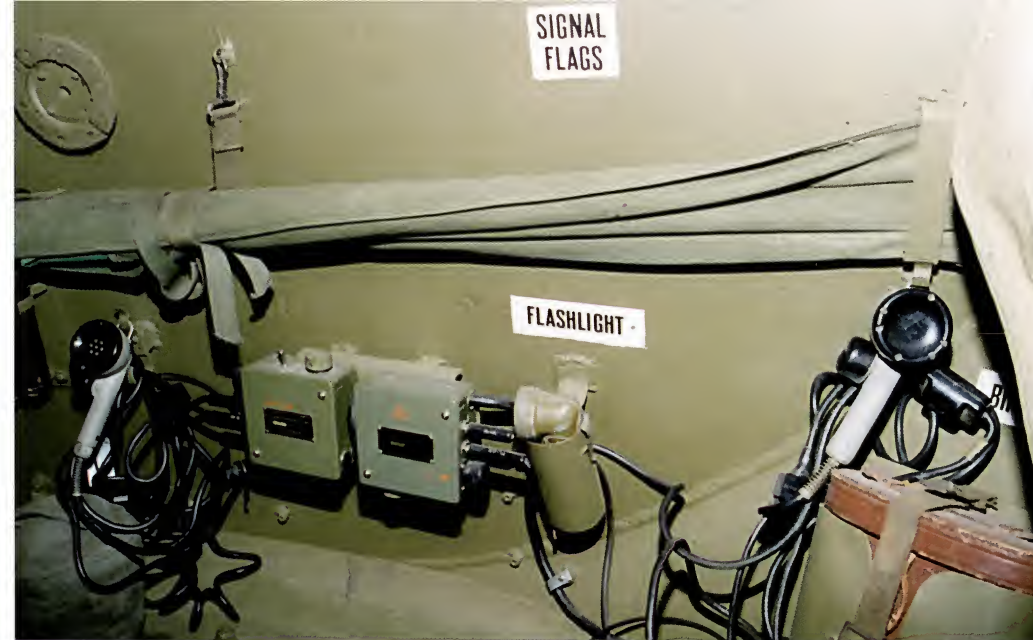
The gunner sat on a seat attached to the small half circle turret basket. This seat could be raised or lowered by a lever on the starboard side, which operated its spring mechanism. Canvas seat belts with metal buckles were fitted to secure the gunner in the seat. The seat bottom and back pads were covered in black leather. (Ward)



The turret's hydraulic and manual traverse system was mounted below the panoramic sight. The gunner manually traversed the turret by grabbing the handle, squeezing the grip closed, then turning it to rotate the turret. The manual gun elevation wheel is located to port. The M3's elevation ranged from $+20^{\circ}$ to -10° . (Ward)

The azimuth indicator provided the gunner with the turret's relative direction in angular degrees or mils in a clockwise position. This indicator was mounted on the turret ring immediately aft of the manual traverse. The T-shaped handle was used to lock the turret into a stationary position. (Ward)



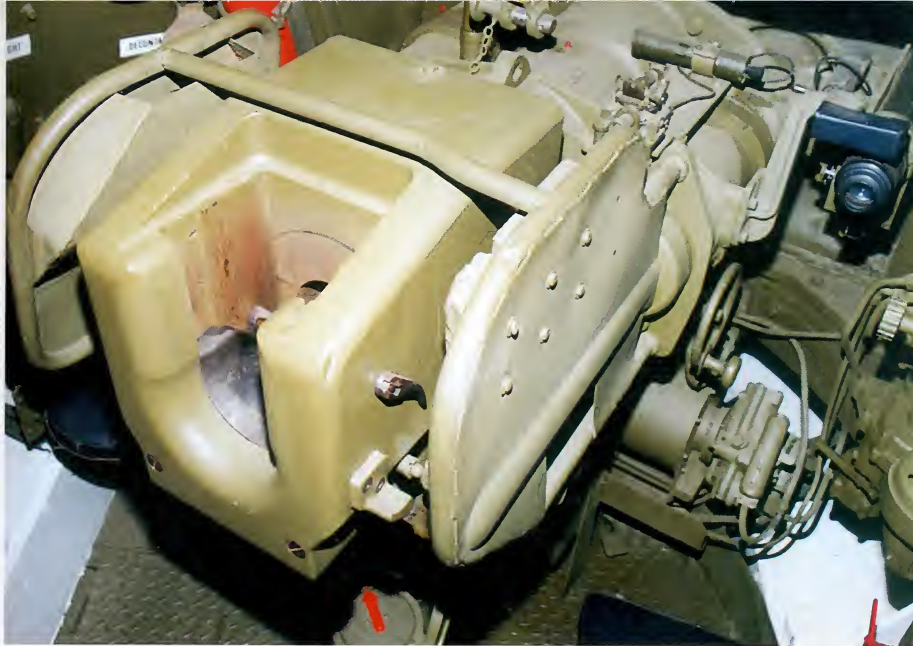


The right turret wall was equipped with two intercom boxes for the gunner and commander. Their headphones and microphones are mounted on the wall, with black cords connecting them to the boxes. A flashlight holder is located beside one intercom box, while a rack for signal flags is placed up along the wall. A field binocular stowage bin is placed at the right rear corner. (Ward)

(Left) The folding commander's seat is mounted on a turret basket support leg. His seat is located immediately aft of the gunner's seat in the starboard turret side. Both seats have black leather-covered cushions; however, only the gunner's seat is fitted with canvas seat belts. The 90MM gun's breech mechanism is located beside these two crewmen's seats. (Ward)



(Right) The commander's seat is folded to allow for more standing room inside the turret. The turret basket support leg where his seat was mounted was welded to the turret ring and basket. This allowed the basket floor to turn with the turret and keep the commander oriented with the direction of the 90MM gun. The box on the bracket side is part of the intercom system. (Ward)



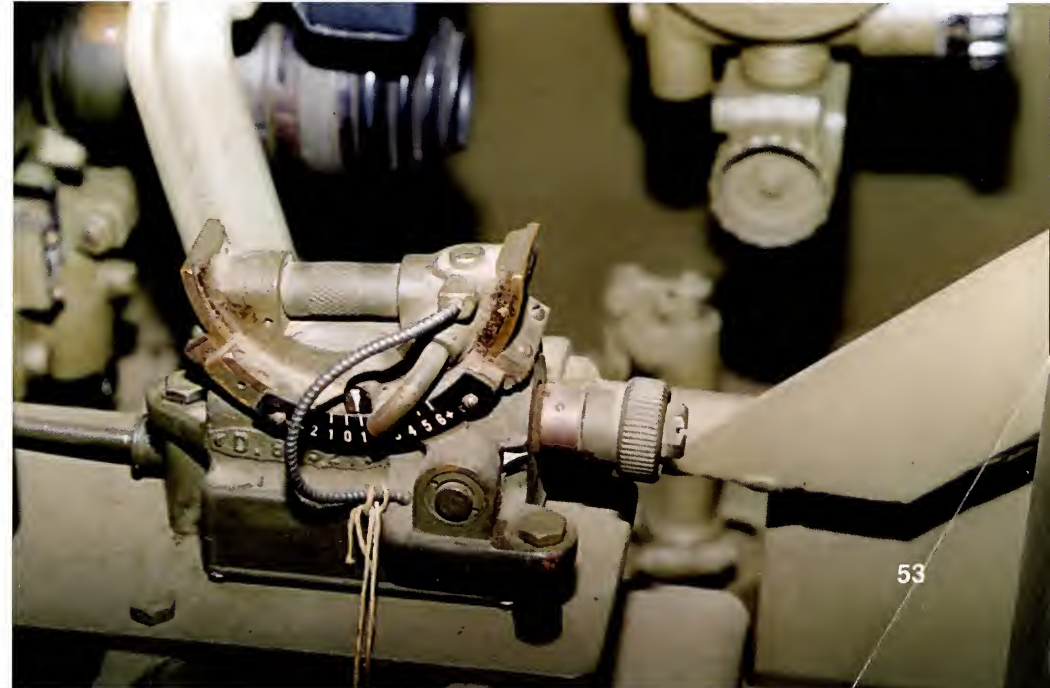
The 90MM M3 gun and breech bisected the M36 turret. The gunner's sight is to starboard and atop the gun. This M36 was demilitarized by the removal of the vertically sliding breechblock. The elevation control wheel is below and left of the sight. The M3 gun's maximum firing rate was eight rounds per minute. (Ward)

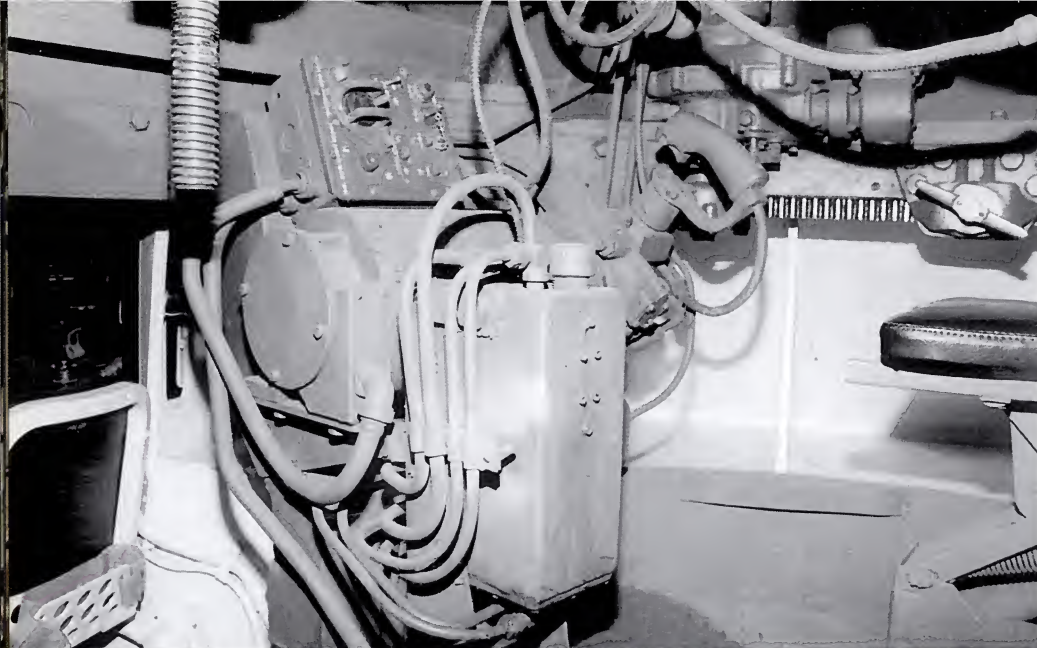
The travel lock was bolted to the turret roof immediately above the M3 gun. This lock had a pin inserted into the V-shaped fitting on the barrel. A stabilizing cylinder, designed to limit barrel movement, is to port. (Ward)



The loader sat to port of the 90MM gun. Recoil cylinders are mounted on both sides of the gun, while recoil guards flank the breech. These guards protected the crewmen from hitting the breech mechanism during sudden movements. A cradle travel lock mounted above the breechblock held the gun stationary during road movement. (Ward)

An M9 Elevation Quadrant was mounted atop the starboard recoil cylinder. This was used to ensure the gun was correctly sighted – primarily during indirect fire support missions. (Ward)





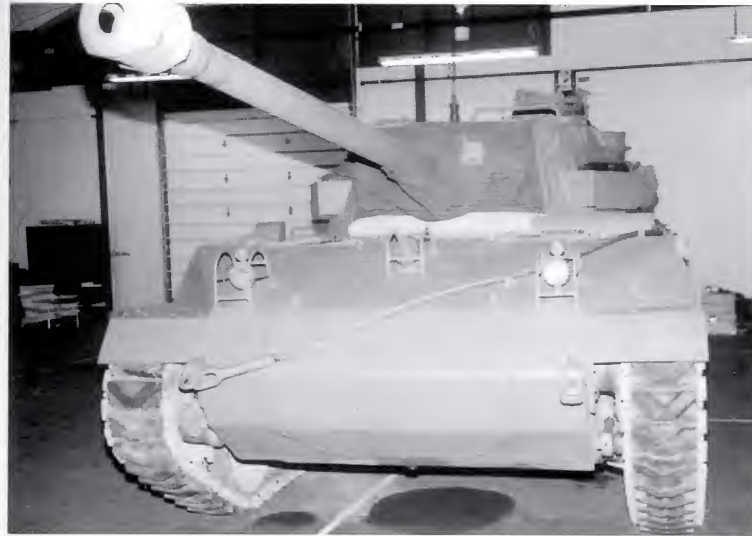
(Above Left) The turret traverse motor was located beneath the breech and gun barrel. A circuit box for the motor and the firing system was mounted on the traverse motor housing. The pistol grip controlled the power traverse and incorporated a trigger for firing the gun. The manual elevation wheel is just above the power traverse control. (Ward)



(Above) Electrical conduits connecting the turret to the hull were mounted on the turret basket floor. A power cable connected these components to the vehicle batteries located under the floor plates. The arrow riveted atop the conduit pointed to the front of the vehicle. The box next to it is a small repair kit for turret problems. (Ward)

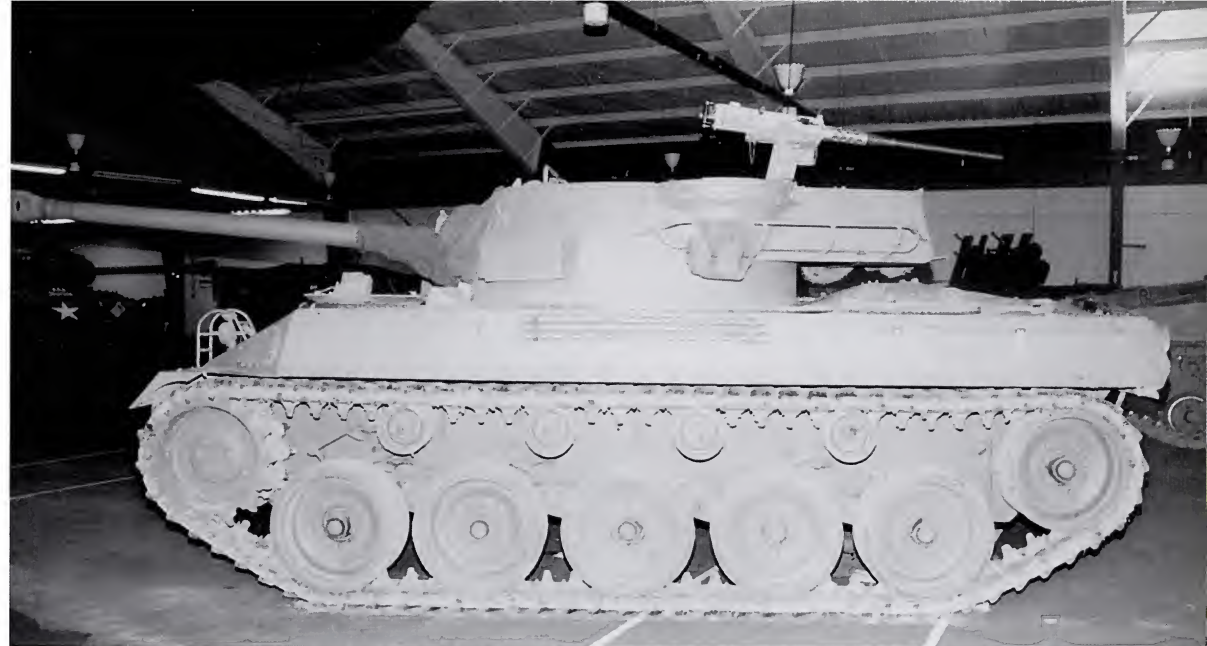
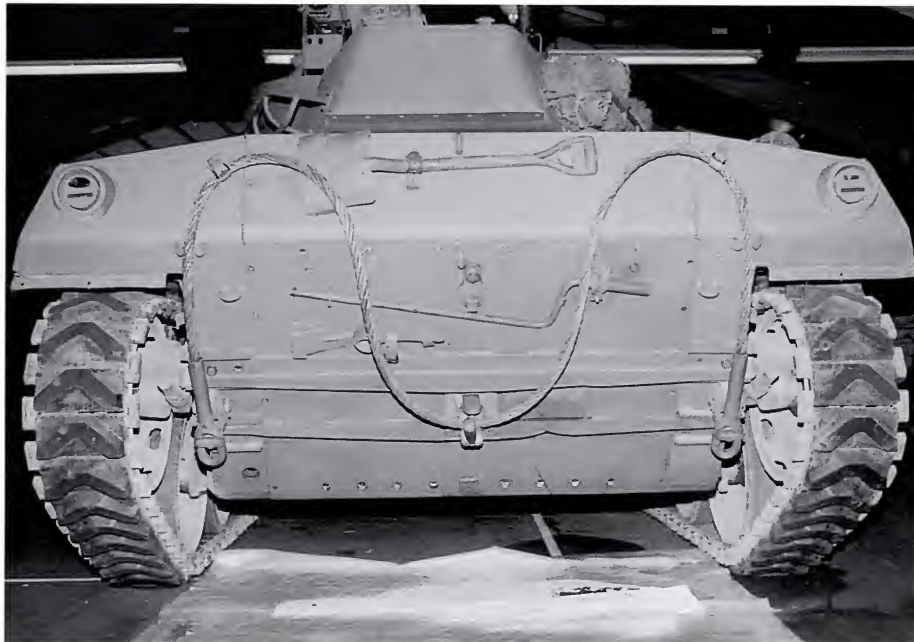
(Left) Two 12-volt batteries were located in bins beneath the floor plates. An electrical conduit is fitted on a pylon atop the basket floor. Cables run down from the conduit to the batteries. The steel floor plates are embossed with anti-skid markings. Batteries were charged from the two 30-volt main generators or from the 30-volt auxiliary generator. (Ward)

M18 Hellcat Tank Destroyer



The M18 Hellcat Gun Motor Carriage (GMC) was the only operational US tank destroyer designed from the start for this role. It was thinly armored, with armor thicknesses ranging from 0.375 inch (0.95 cm) to 1.75 inches (4.4 cm). The hull plates were angled up to 50° to get the maximum available protection. (Ward)

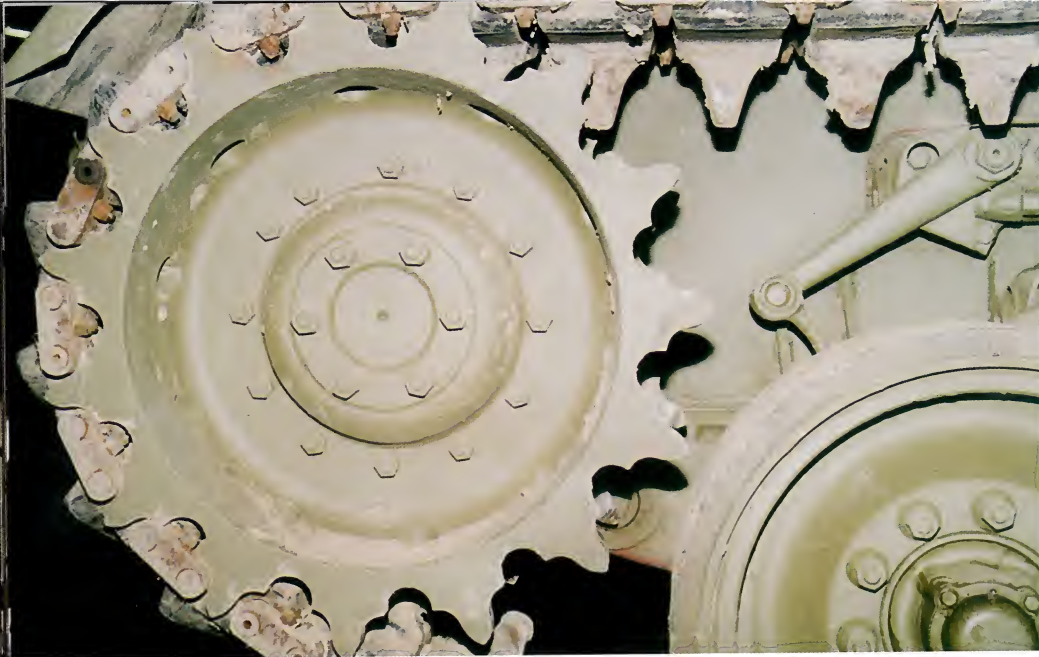
The M18's angular rear housed the 460 hp Continental R-975-C4 gasoline powered engine. This engine was mounted on rails that allowed it to be withdrawn after being disconnected from the vehicle and off-engine components. The Hellcat was the fastest tracked armored vehicle used in World War Two, with a maximum road speed of 55 MPH (88.5 kmh). (Ward)



The M18 was equipped with a torsion bar suspension and five road wheels per side. Like the M10 and M36, it had a front mounted drive sprocket and rear mounted idler wheel. The turret mounted a 76mm M1 gun like that used in later M4 Sherman tank variants. Early vehicles were not normally equipped with muzzle brakes on the 76mm gun. (Ward)

The M18's starboard side was identical to the port side, except for a few differences in the turret. Four track return rollers helped guide the tracks and reduced shedding. Each track consisted of 83 shoes. Shock absorbers were installed on all of the road wheels, except the center unit. (Ward)





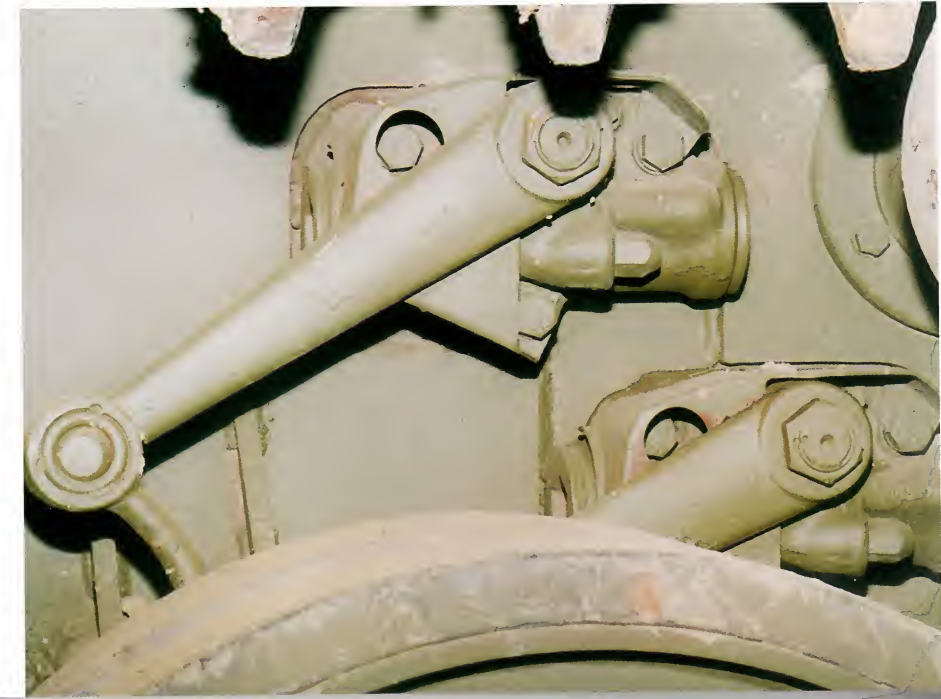
The M18 originally had two 31-tooth drive sprockets for the T69 steel track. Later production and postwar upgraded models were fitted with 15-tooth sprockets to handle the rubber chevron type tracks. (Ward)

Five individually sprung road wheels were mounted on a torsion bar suspension, while four individual track return rollers were mounted on the hull. Each was covered with a vulcanized rubber rim for a smoother ride. The M18 was the first operational American armored vehicle to enter service with this suspension type. (Ward)



The sprockets – composed of an inner and outer disk – had a series of holes drilled in them to make them lighter and allow mud to fall through. The track was kept in line by being guided down the sprocket's center gap. Six bolts secured the inner and outer sprocket disks to each other. (Ward)

All but the center road wheels were fitted with shock absorbers. It was felt that the middle wheel did not require a shock absorber due to its center position. The shock absorbers located on the two forward and two aft wheels were deemed sufficient. (Ward)





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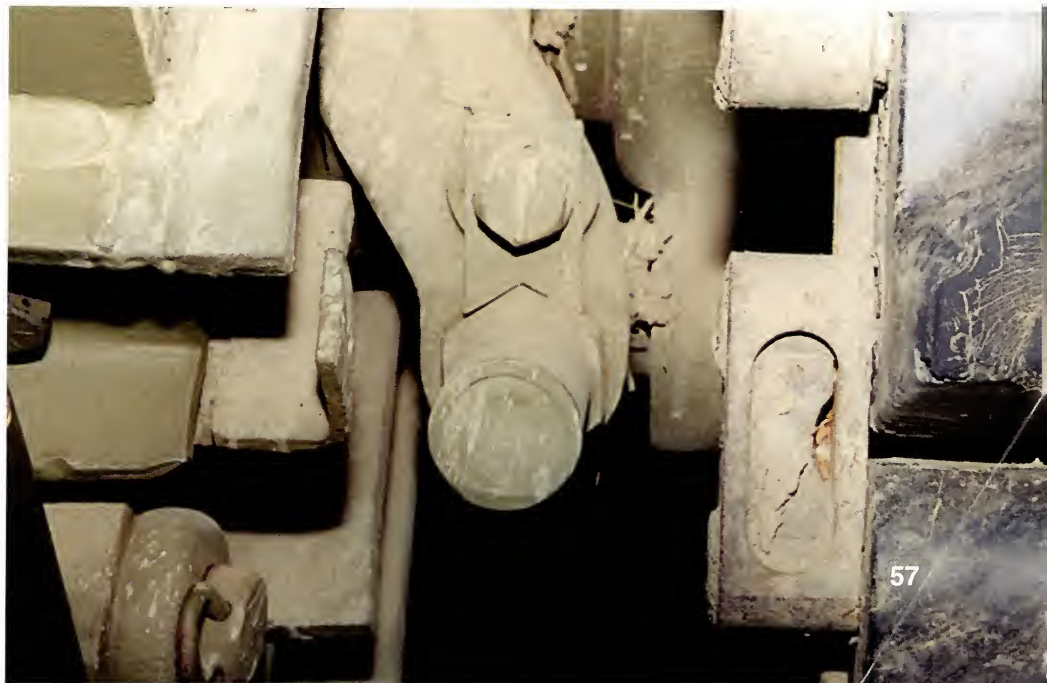
The idler wheel was located in the rear and was similar to the main road wheels. Unlike the main road wheels, the idler did not have a rubber outer surface. Ten bolts connected both the idler and main road wheel dishes. (Ward)

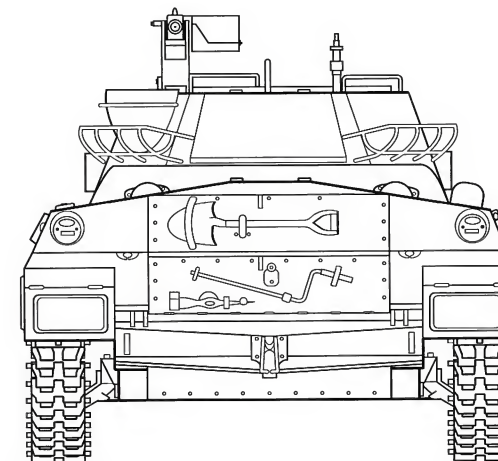
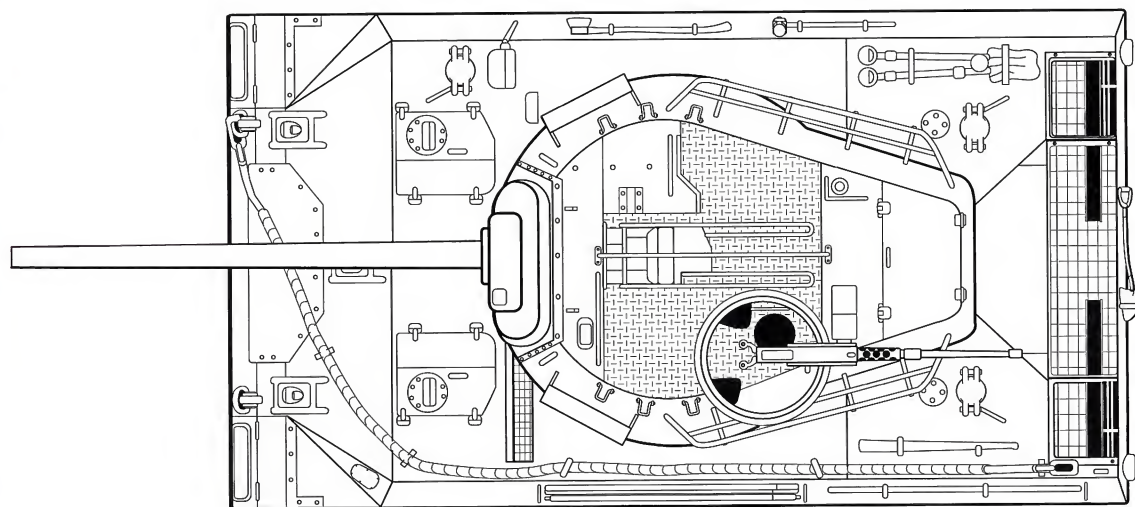
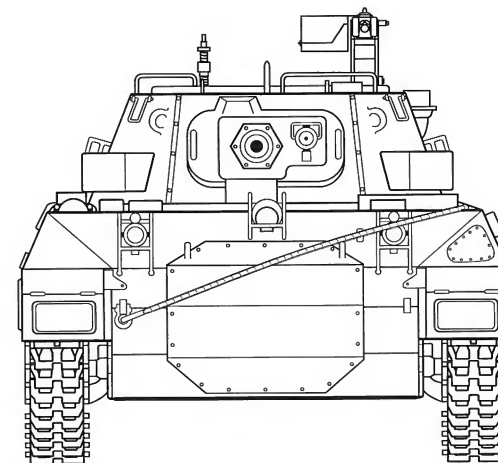
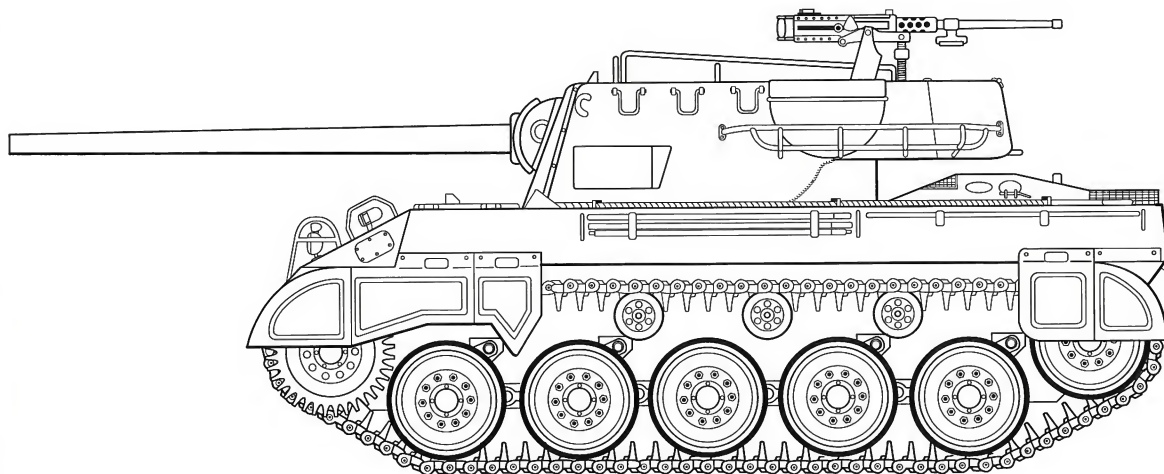
Turning a large nut on the idler wheel mount altered the track tension. It is the round projection to the right of the tow cable head. The port side was a mirror image of this arrangement. (Ward)



The idler wheels also had a series of holes for mud to drop through and to lighten the casting's weight. These holes are oval versus the round holes put into the drive sprocket. (Ward)

The track tension-adjusting nut was tightened or loosened by a wrench. A second nut was used to lock down a wedge shaped retaining bar over the tension nut. Proper tension was achieved by placing blocks of wood between the second and fourth return rollers and the track. The nut was adjusted until the track barely touched the third return roller. (Ward)





M18 Hellcat Gun Motor Carriage (GMC) Specifications

Length:.....21 feet 10 inches (6.7 m)

Width:.....9 feet 9 inches (3 m)

Height:.....8 feet 5 inches (2.6 m)

Empty Weight:.....35,000 pounds (15,876 kg)

Combat Weight:....40,000 pounds (18,144 kg)

Powerplant:.....One 460 HP Continental R-975-C4 nine-cylinder, air-cooled, radial engine.

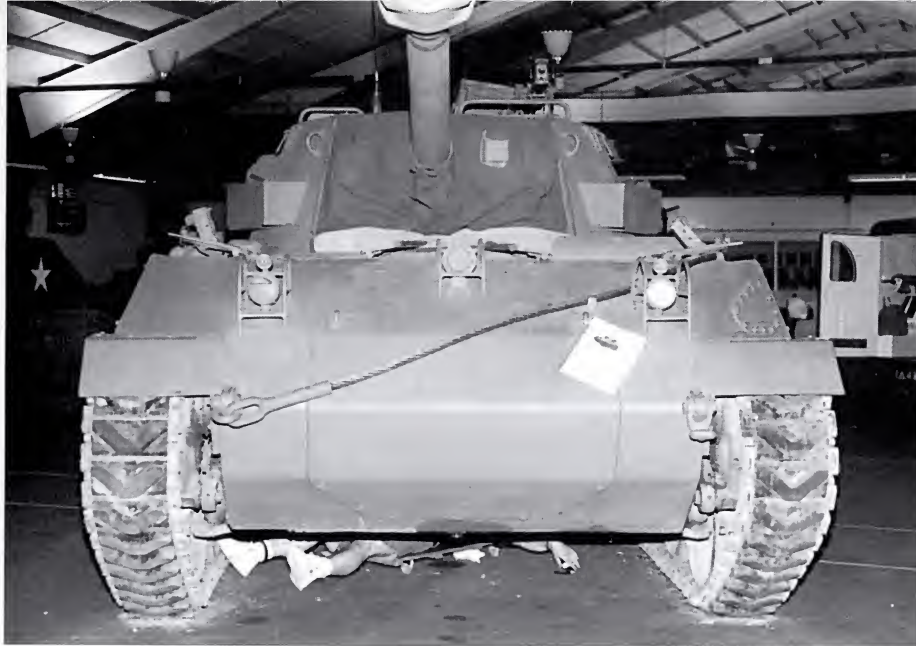
Transmission:.....Torqmatic – three speeds forward, one speed reverse

Armament:.....One turret-mounted 76mm M1A1, M1A1C, or M1A2 gun with 45 rounds, and one .50 caliber (12.7mm) Browning M2HB machine gun with 800 rounds on aft turret position.

Maximum Speed:55 MPH (88.5 kmh)

Range:.....150 miles (241.4 km)

Crew:.....Five



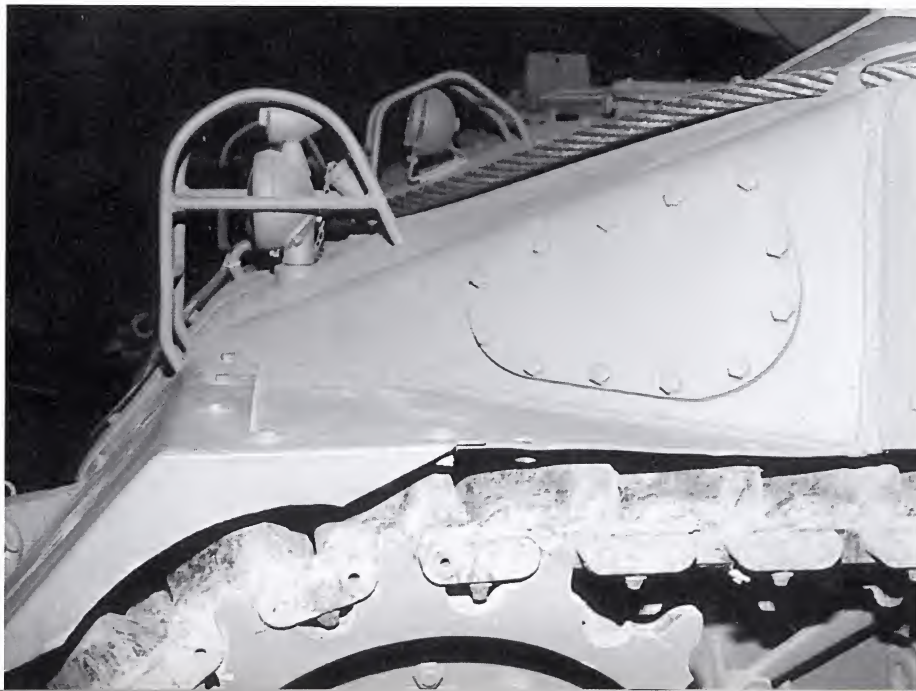
The glacis plate was dominated by a large, removable panel held in place using 19 bolts. The panel provided access to the transmission and differential unit, which slid out on rails. This was a new innovation that helped speed up maintenance and repairs. (Ward)

Headlights and guards were mounted next to each fender. The steel tube guards were identical for each side. The small bolted hatch is an access port for the radio set located in the port forward hull. (Ward)



Tow shackle mounts were welded to the front corners of the hull. Large cotter pins were used to secure the pins that held the U- or L-shaped shackles in place. Tow cable heads were slipped over the shackles when the M18 was engaged in towing operations. (Ward)

Each light was removable for replacement. The resulting hole was plugged by a cap to keep out moisture and debris. The retaining chain connected the headlight base to the light guard. A blackout headlight for night driving at the front is mounted atop the standard headlight. (Ward)





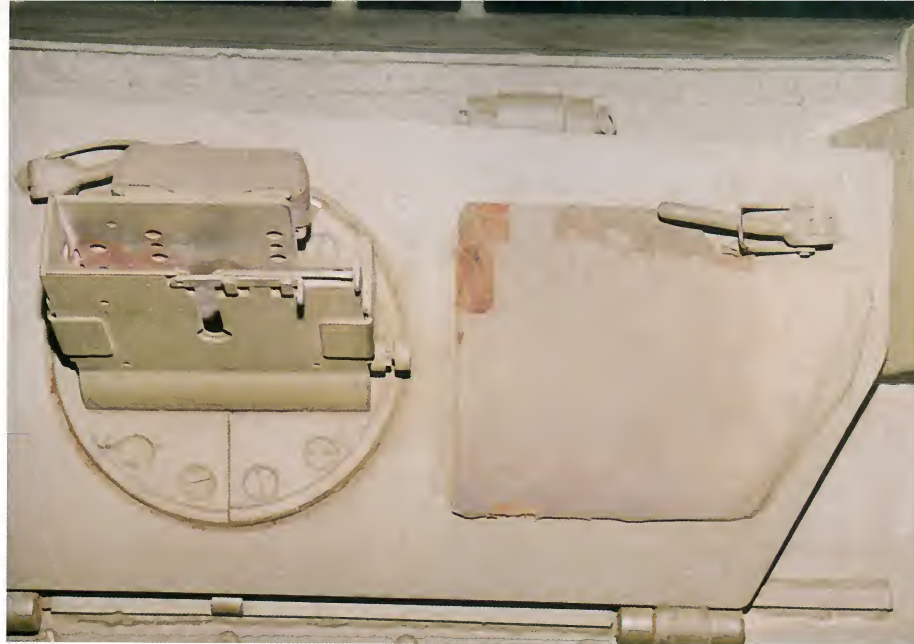
(Above Far Left) This M18's starboard headlight has a blackout guard fitted over the lens. The holder for the socket plug is located just to the left. The welded bent rod guard was a distinctive style only used on the M18. (Ward)

(Above Near Left) A horn and guard were mounted in the upper center portion of the glacis plate. The driver activated the horn by depressing a foot pedal. This horn was used to warn approaching foot or vehicular traffic. (Ward)

(Above) The horn guard had a more angular shape than the rounded headlight guards. A cord connected the horn to the M18's electrical source. It ran into the hull immediately behind the horn. (Ward)

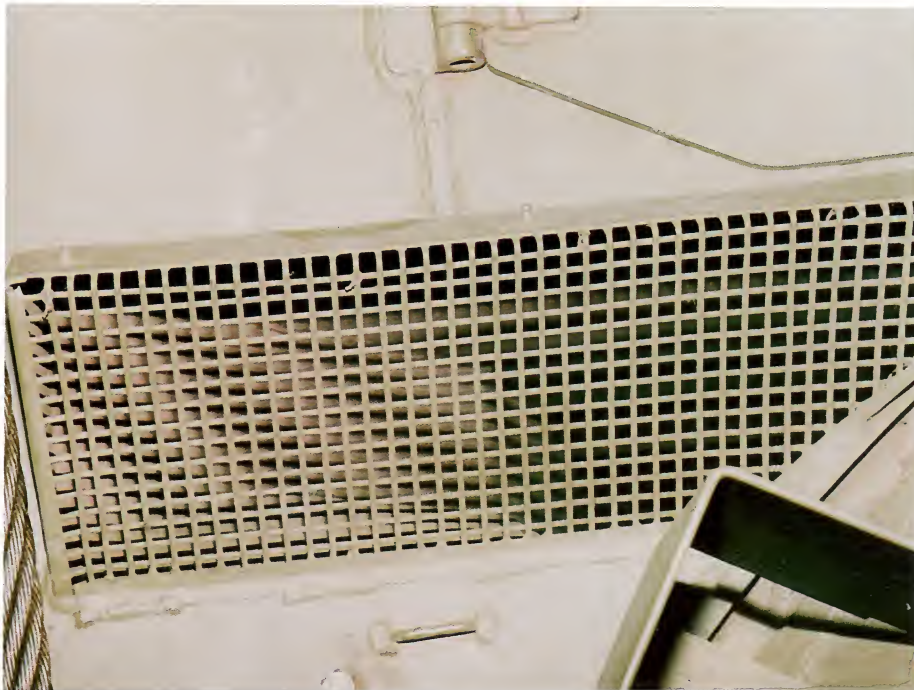


(Left) The driver to port and the co-driver to starboard each had two section hatches; this is the driver's hatch with the front of the vehicle being to the left. An M6 periscope and a grab handle were mounted in the outer hatch section, while the inner section was devoid of any fittings. Each section opened to the sides. (Ward)



The periscope housing and protective head pad were mounted on the inside of the outer hatch section. This is the co-drivers hatch. Both the co-driver's and the driver's hatches were mirror images of each other. Hatch inner surfaces were painted Olive Drab (FS34087) to blend with the hull when open. (Ward)

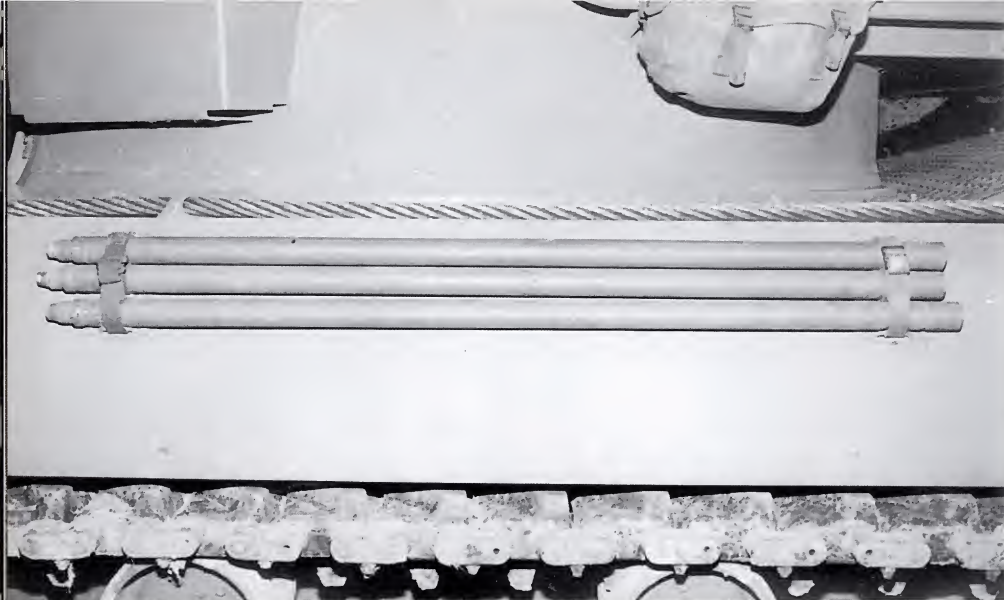
A transmission and differential oil cooler system exhaust screen was mounted on the hull roof immediately behind the driver's hatch. Heated air from this system was vented through this screen to cool the compartment. M18s were equipped with a four-speed (three forward, one reverse) torqmatic transmission. (Ward)



Each hatch could be fitted with a windshield and foul-weather hood to protect the drivers from the elements. The windshield was equipped with a wiper and was held in place by wing nuts atop the shield via the long bolt along the side. The hoods were normally used outside of the immediate combat area and stored in special baskets on the turret side. Crews often discarded or left them in the rear area. (Ward)

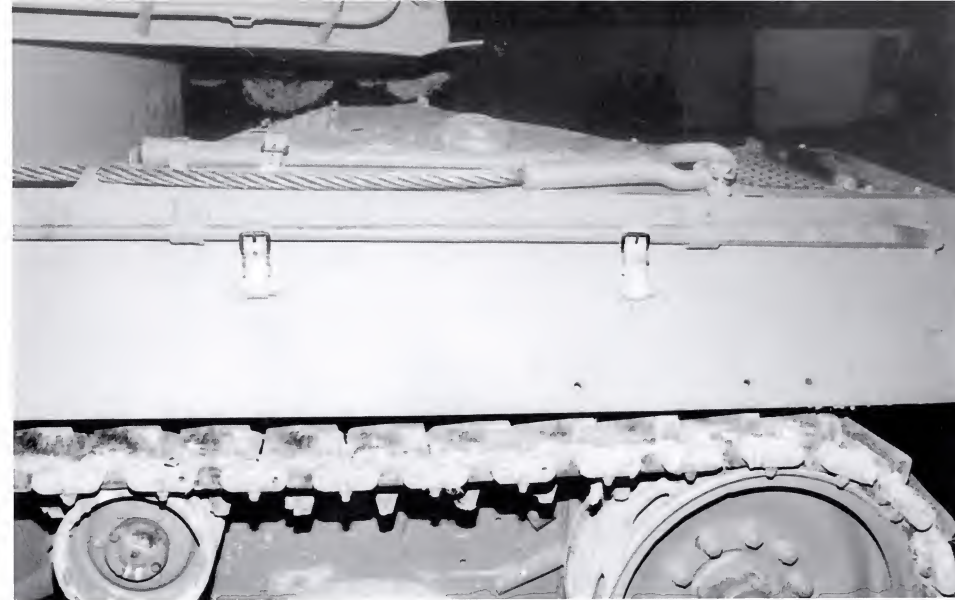
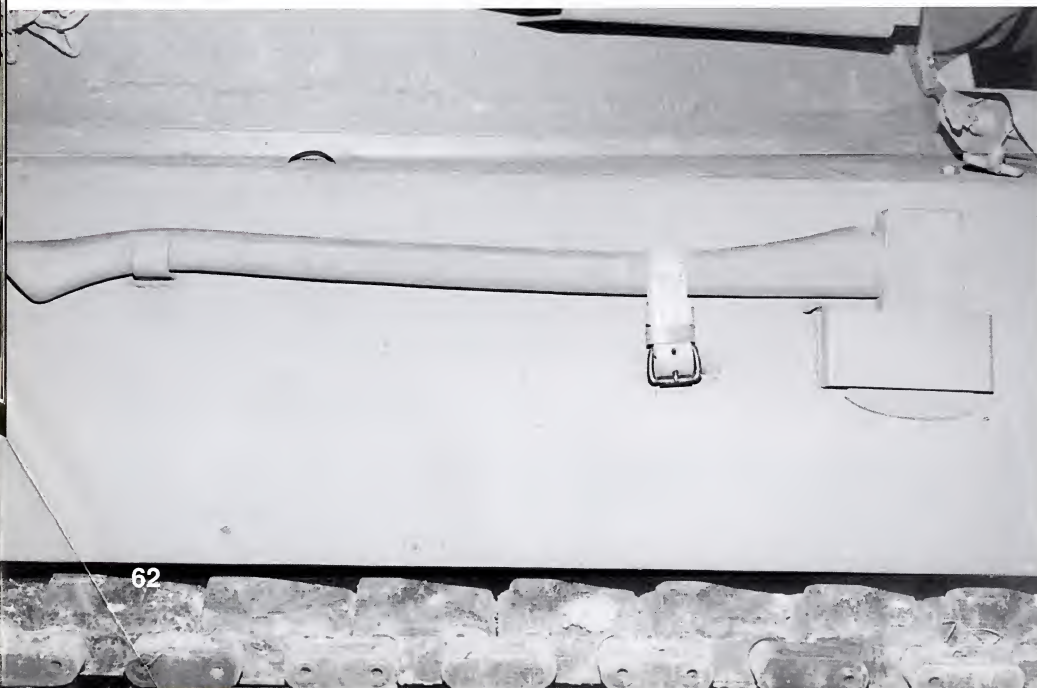
A small screen for the 24-volt Homelite auxiliary generator was mounted on the roof behind the co-driver's hatch. The external fire extinguisher housing is mounted at left. (Ward)





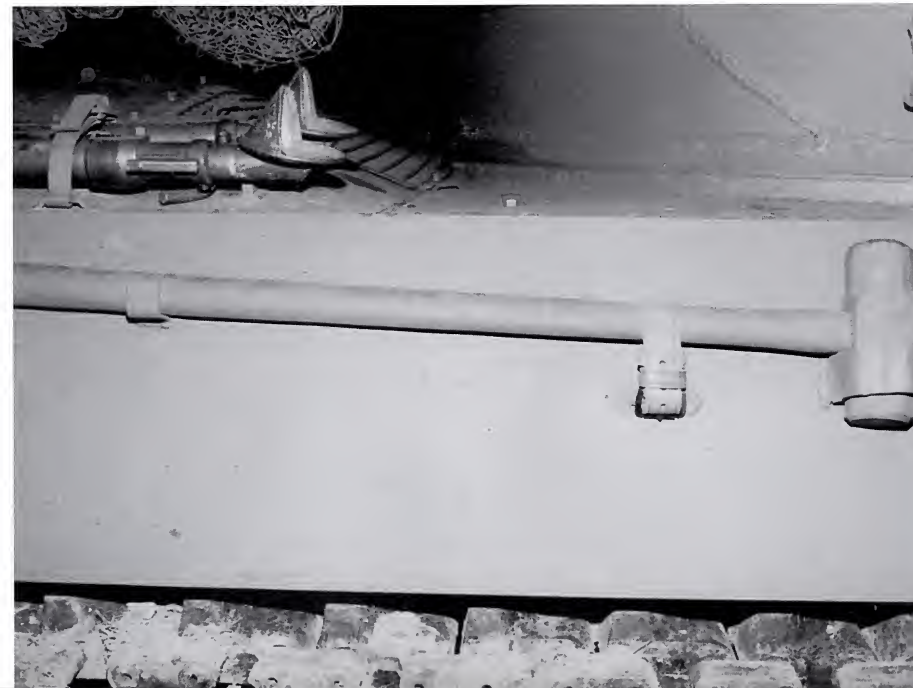
The upper port and starboard hull sides and the hull rear were used to mount an assortment of vehicle equipment and crew kit. Three gun barrel cleaning rods were stowed on the port front hull side. These rods were screwed together and a brush head (not seen here) fitted for cleaning powder residue from the barrel. (Ward)

The axe was mounted on the starboard front hull side and held in place by two brackets and a leather strap. Crews used the axe for cutting down trees when camouflaging the vehicle in the field. The metal axe head and wooden handle are painted Olive Drab to match the hull side color. This was usually the case with externally stowed equipment. (Ward)



The pry bar was mounted on the port hull side immediately aft of the gun cleaning rods. This bar was held in place by two U-shaped brackets and secured by leather straps. A retaining flange at the rear of the bar stopped it from sliding. The tow cable and pick axe handle are stowed on the engine deck's port side. (Ward)

Similar means were used to hold the sledgehammer in place behind the axe. The tripod for the .50 caliber (12.7mm) machine gun was mounted on the starboard side of the engine deck. This tripod was used when the crew removed the machine gun from its mount on the turret and deployed it for ground firing. (Ward)





The engine deck's port side held a tow cable and the pickaxe handle. This steel cable was used for towing other vehicles or objects, usually when they were disabled and unable to move on their own. Crews employed the pickaxe for cutting into concrete, ice, and similar materials. Just beyond the axe handle is one of two armored covers for the fueling ports. (Ward)

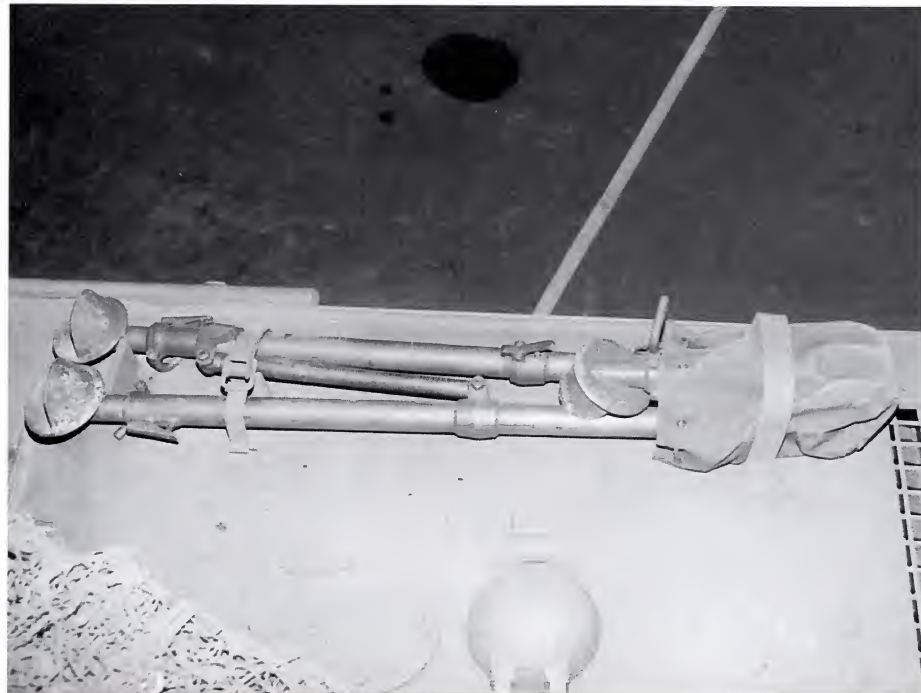


(Above) The cover was the standard cast type used on armored vehicles and hinged to open on one side. A simple pin was used to lock the cover closed. The casting is particularly rough around the attachment flanges. (Ward)

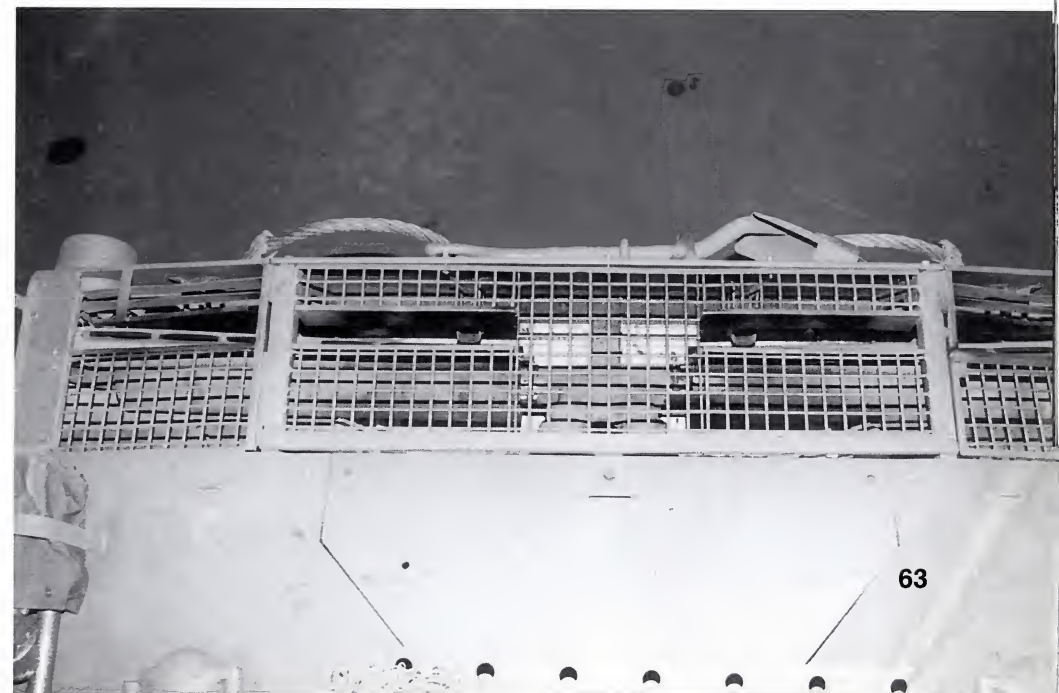


(Right) The fuel port top cover provided protection from shrapnel and small arms fire for the gas cap and filler neck. Two 82.5 gallon (312.3 L) capacity fuel tanks were mounted on either side of the engine under the engine compartment deck. (Ward)

The .50 caliber machine gun tripod and the second armored fuel port cover were located on the starboard side of the engine deck. A canvas bag covers the weapon attachment point on the tripod. This protected the point from moisture that interfered with proper machine gun fitting onto the tripod. (Ward)



Three screens covering the exhaust pipes ran along the aft edge of the engine deck. The screens allowed cooling air to pass over the exhausts and warm air to escape the vehicle. A triangular intake grill was set into the front of the engine deck, but it is often hidden by the turret bustle. (Ward)





Taillights were mounted on the rear hull corners. These units were set in mounts welded to the rear hull plate. The port taillight was a standard type incorporating a red lens. (Ward)



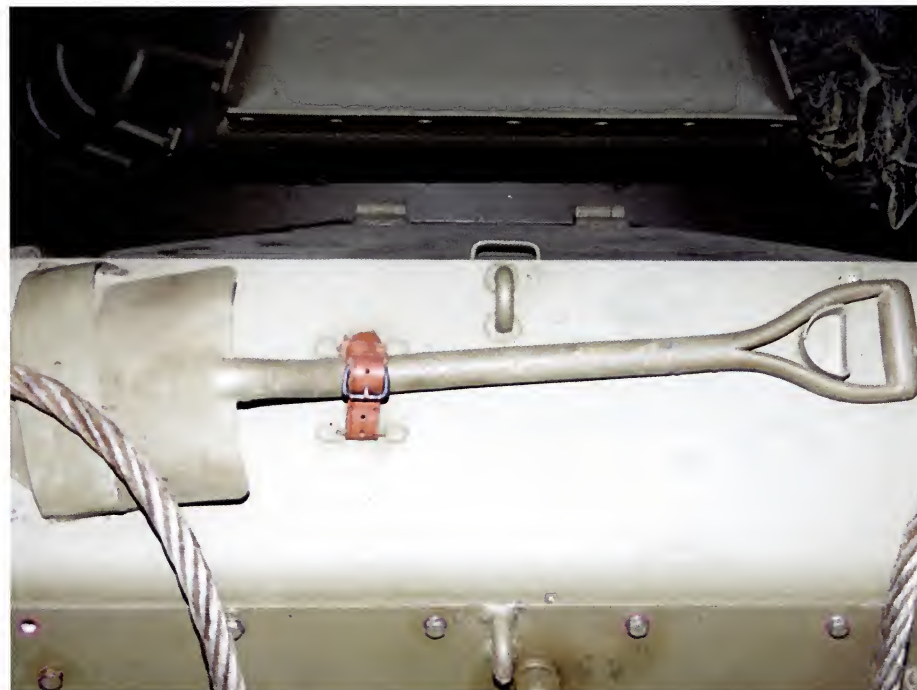
The starboard taillight was a blackout light used for night driving. A thin slot is placed over the red lens to reduce the amount of light. This lessened the risk of the vehicle's detection by enemy forces at night. (Ward)



A tow pintle was mounted on the lower center of the hull rear plate. A small lever locked and unlocked the pintle for use. The lever was normally located on the right side, but this one was broken off. (Ward)

The rear hull was used to stow the shovel (top), the manual engine crank, and the pickaxe head. A covered opening for the engine crank is just above the manual crank. The manual crank was inserted into the opening and turned to ignite the magneto, which started the M18's engine. The tow cable runs down from the engine deck sides to the tow pintle. (Ward)

The shovel was held in place by two brackets and a leather-retaining strap. The various pioneer tools were usually painted Olive Drab rather than being left in natural wood and metal. These tools were used by both the M18's crew and by other soldiers accompanying the vehicle. Part of the tow cable runs in front of the shovel head bracket. (Ward)



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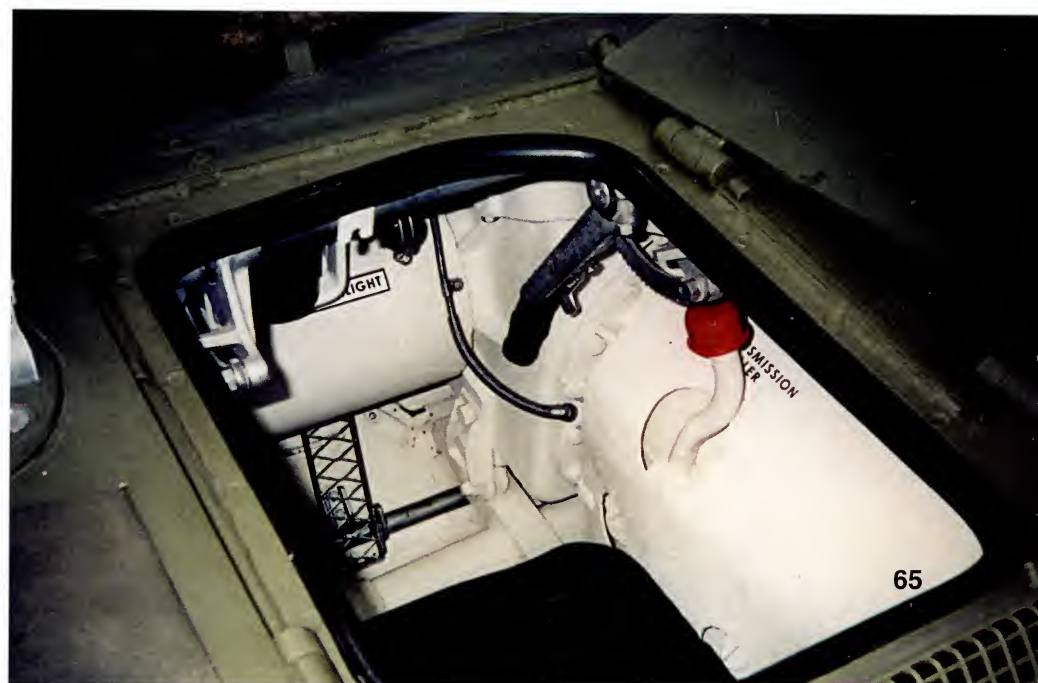
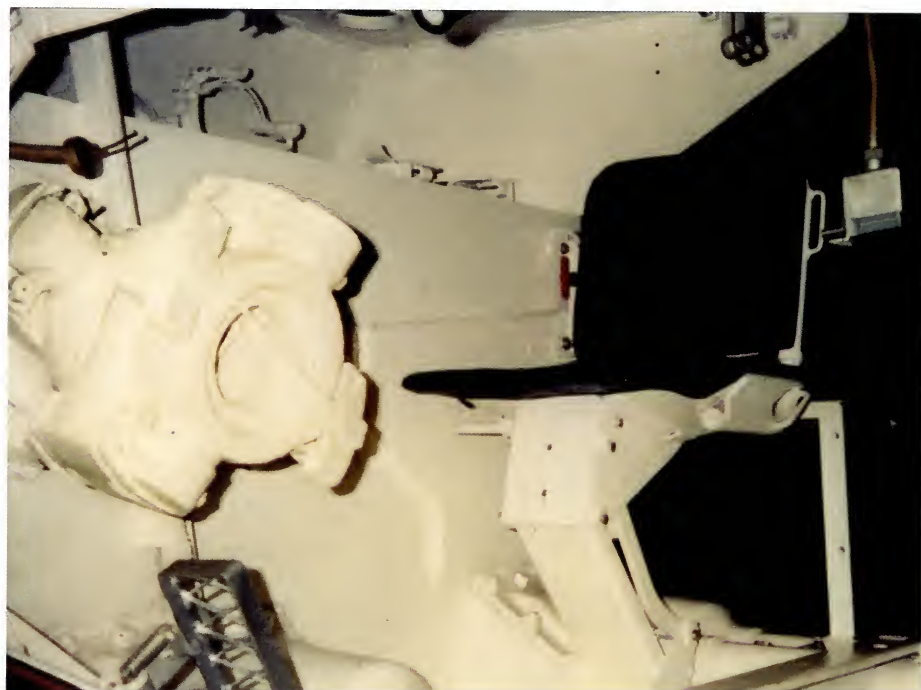
The M18 featured a removable differential housing and transmission that slid out on rollers. This required the removal of 19 bolts and the armored panel on the glacis plate. When this unit was removed, the opening provided easy access to the hull interior. (Mullins)

The co-driver's position was nearly identical to that of the driver. The accelerator pedal is mounted just below the drive sprocket housing. The fighting compartment was painted white for improved lighting when the hatches were closed. (Mullins)



Removing the glacis panel and transmission allowed access to the driver's position in the front hull. The back of the drive sprocket housing is at right. Steering and braking controls for the driver were suspended from the hull roof. (Mullins)

The open driver's hatch reveals the natural metal accelerator pedal mounted on the floor. His steering lever descends from the compartment ceiling near the hatchway. Rubber seals along the hatchway keeps water from leaking into the compartment. (Mullins)





The small M18 was not uncomfortable for its crews; however, there was little room to move around. Both drivers were separated by the transmission housing in the forward hull. The seat cushion is missing from this unrestored M18. (Ward)

The M18 steering and braking controls were suspended from the hull roof – a feature also found on the M5 Stuart light tank. These levers engaged the toothed quadrant atop the column to put the M18 into motion. (Ward)



The driver's instrument panel was mounted in the port sponson. A fuel switch is located on the panel's lower left side, below the fuel gauge and to port of the oil temperature gauge. The two large gauges are the engine tachometer (left) and speed gauges. The oil gauge and ammeter are mounted on the lower right side. The three switches in the upper center are for the booster coil (left), magneto (top), and starter (right). (Ward)

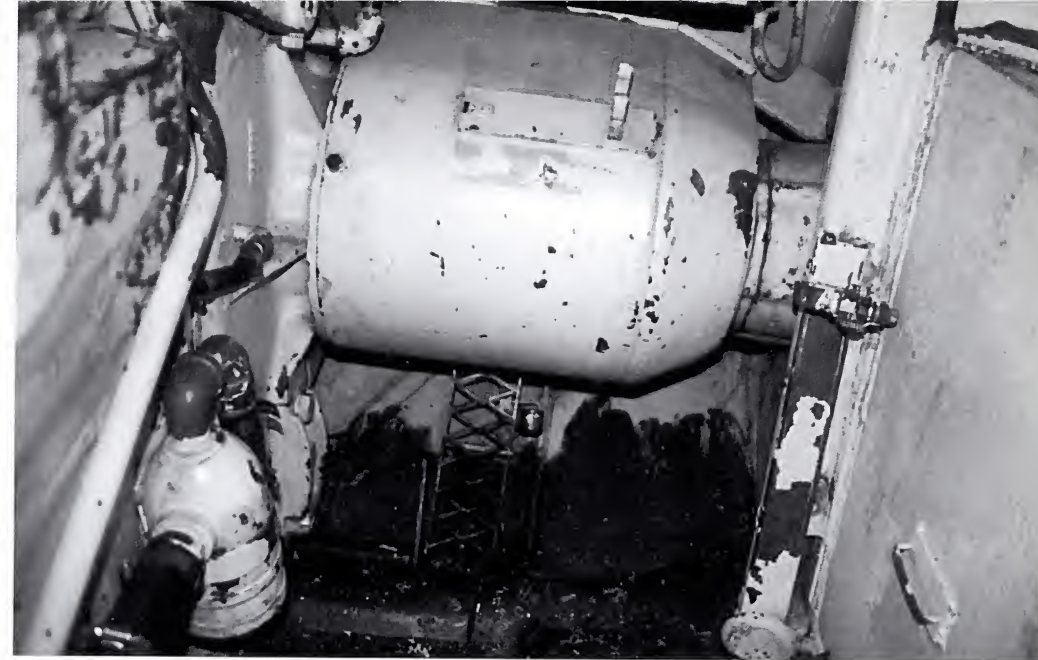
A thumb activated engagement lever mounted on the driver's control arm allowed the control to engage the quadrant. The engaging device is just under the quadrant where the control crosses behind it. A release device is just above the black handgrip on the bottom of the control arm. (Ward)



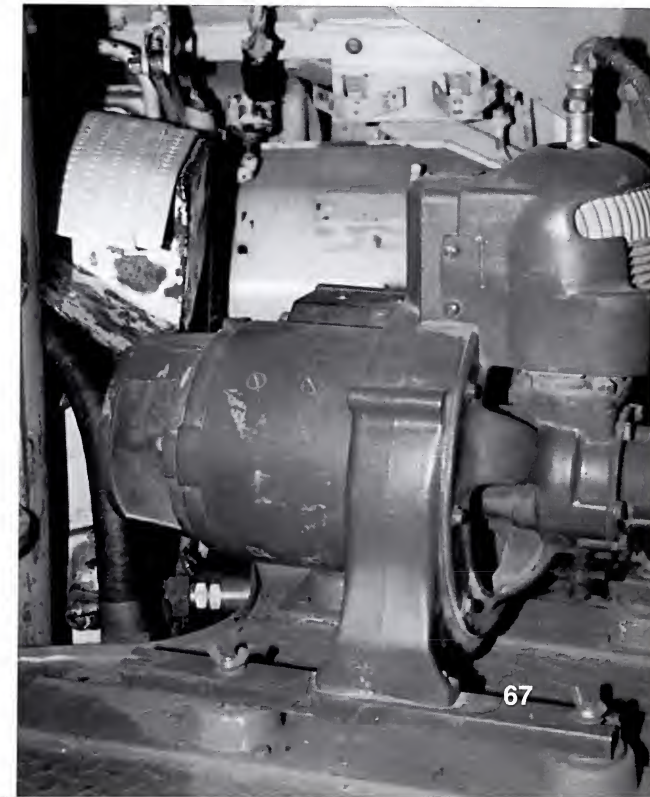


The transmission split the driver's compartment in half. A short, manual gearshift lever was mounted atop the housing where both drivers could use it. The M18 had three forward speeds and one reverse speed, along with neutral. The transmission oil dipstick has a red cap on the transmission's side. (Ward)

The co-driver's control levers were slightly different than the driver's in having no quadrants. They could be used to operate the vehicle, however, they could not be used as a parking brake. This lever was put in the non-operating position by moving it forward into a spring held clamp. (Ward)



The co-driver's compartment was virtually a mirror image of the driver's side. The accelerator pedal – a simple frame with a mesh insert – is located below the differential housing. (Ward)



An 24-volt auxiliary generator was located behind the co-driver. The generator provided auxiliary electrical power when the vehicle engine was not running. The M18 also had a 24-volt main generator, which was driven by the Continental R-975 engine. (Ward)



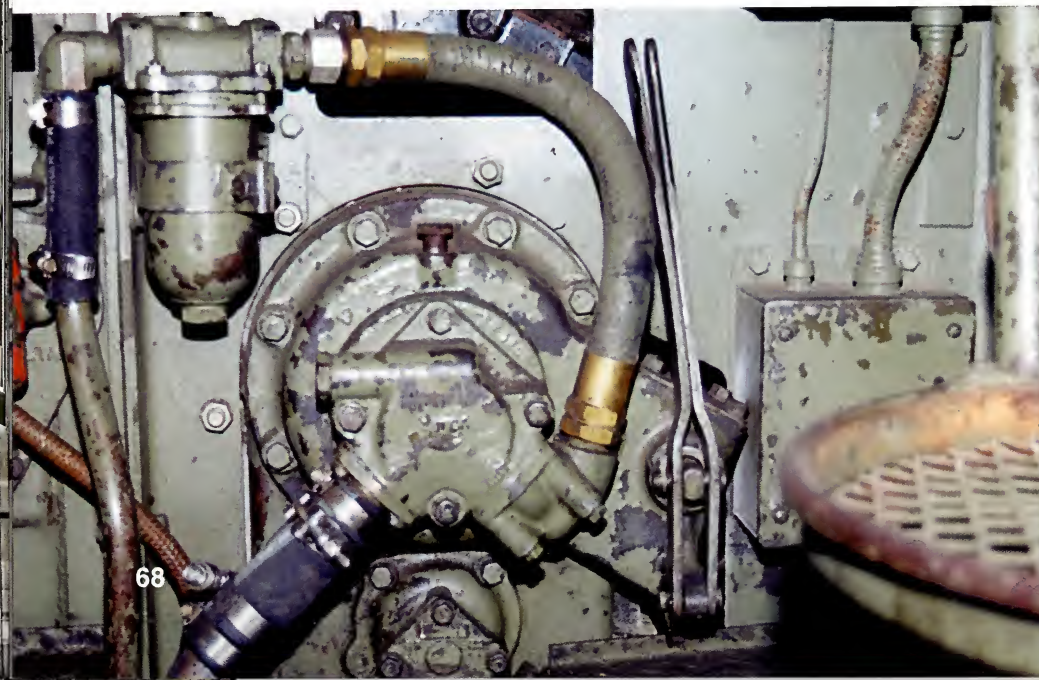
Storage racks for the 76mm main gun rounds were set into the hull sponsons. There was hull space for 36 rounds – 18 on each side – in two sets of racks containing nine rounds. These combined with the nine ready rounds in the turret for the M18's total load of 45 rounds. These were a combination of high explosive, armor-piercing, and smoke shells.

The engine lubrication pump and piping is mounted on the fighting compartment's rear bulkhead. An oil filter is mounted at upper left, while the commander's seat frame is to the right. The M18 was supplied with 36 quarts (34.1 L) of motor oil.



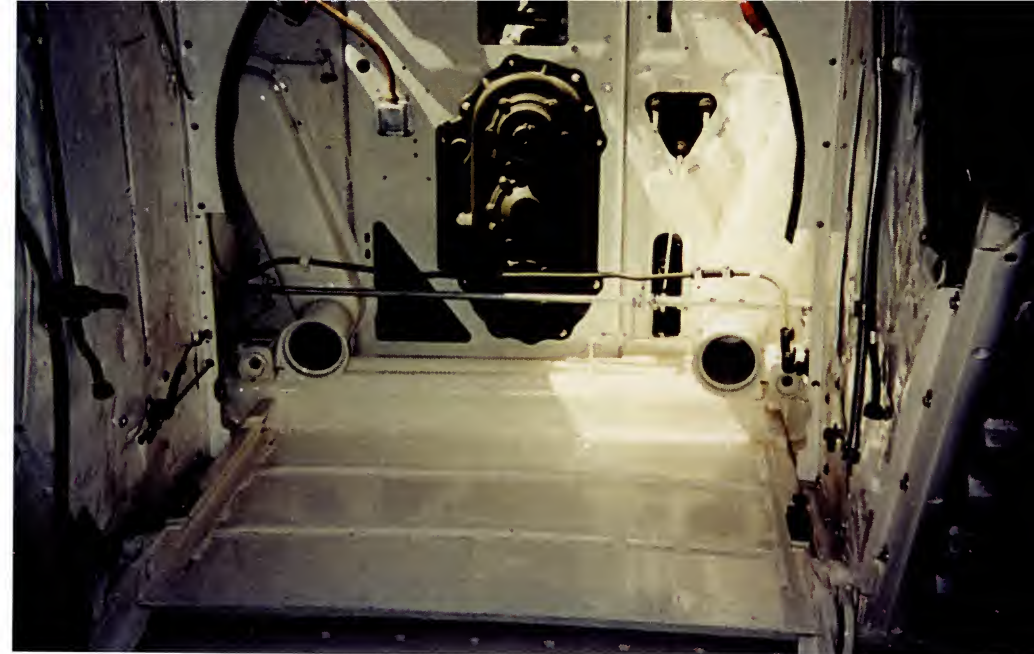
The base of the 76mm shells slid into these retaining clamps while the projectile tip fit into the cylindrical framework. Once the rounds were unlocked, the framework holding the projectile could pivot out to help release the rounds. Either driver passed these rounds up to the loader in the turret.

Filtered engine air intakes were also mounted adjacent to the aft bulkhead. The three red fuel tank shut off valves are located on the triangular plate. The upper left lever controlled the fuel balance tube, the upper right valve shut off the port fuel tank, and bottom lever closed the starboard fuel tank.

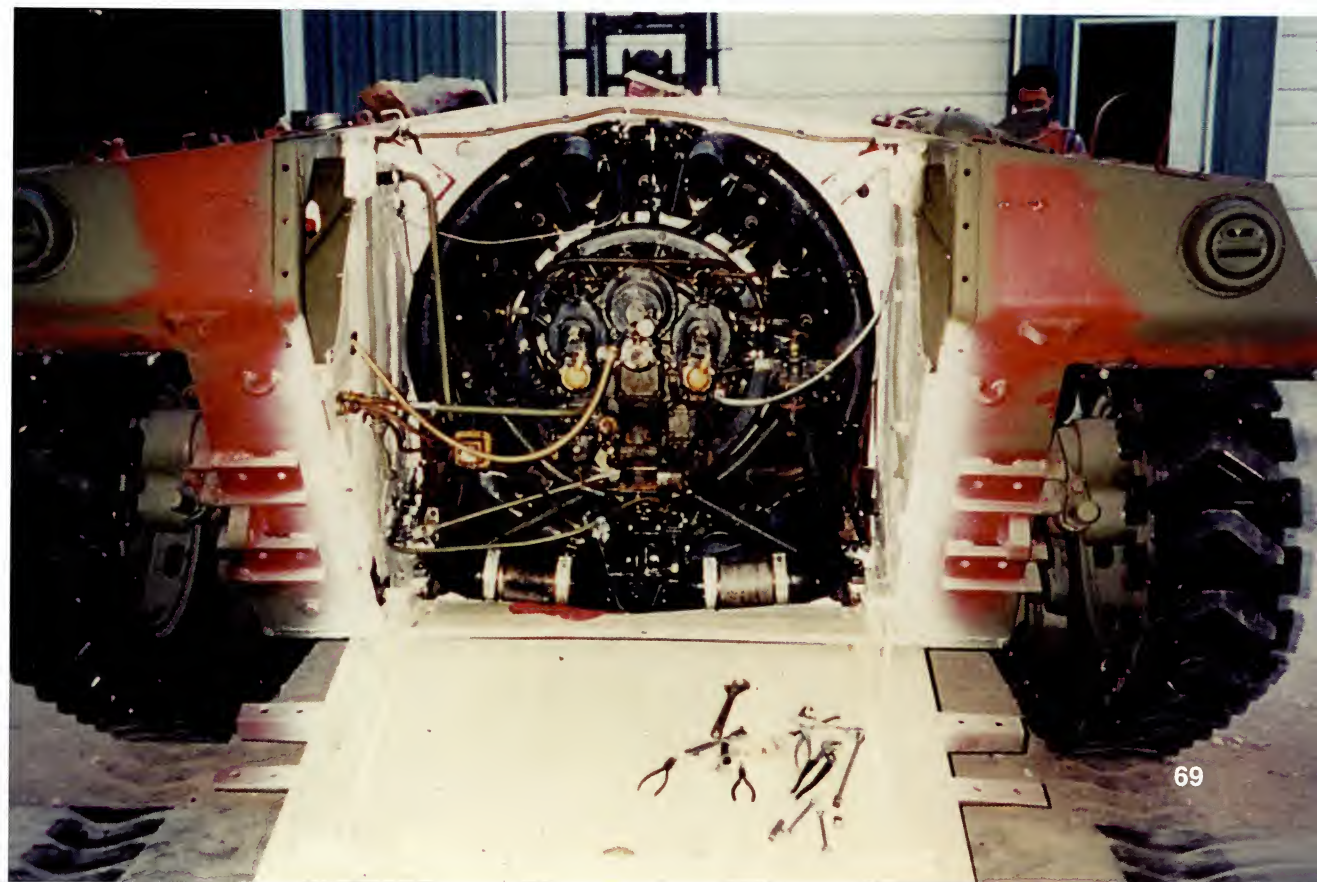




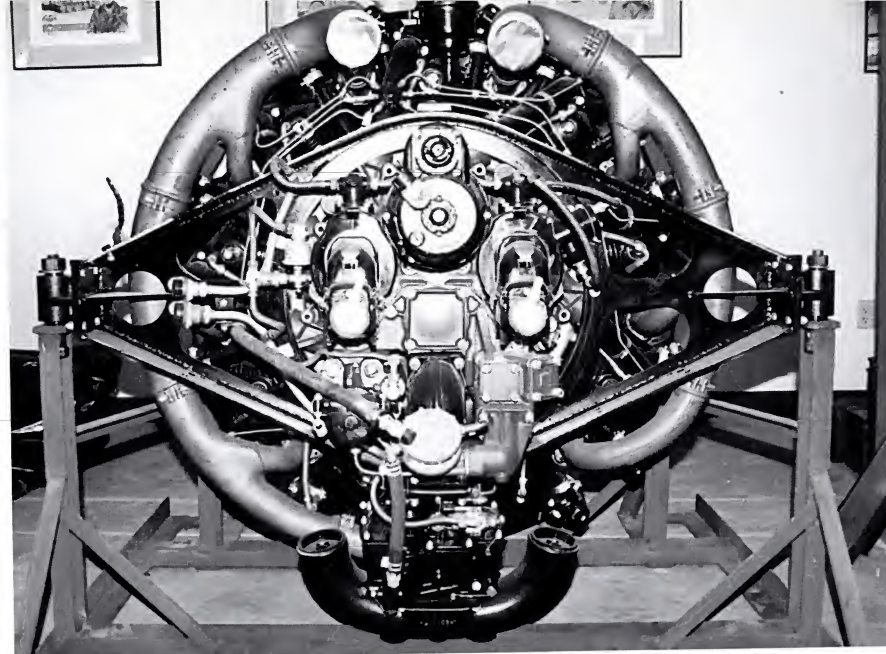
(Above) Fuel tanks were mounted on both sides of the engine compartment and covered by a removable panel for servicing. The M18 carried 165 gallons (624.6 L) of 80-octane gasoline. It had an approximate cruising range of 100 miles (161 km). (Mullins)



(Above Right) The Continental R-975 engine was fitted into the engine compartment on four sets of rollers. The guides for these rollers are located on the compartment floor. The transfer case is set into the middle of the bulkhead. Two circular openings are part of the engine air induction system. (Mullins)



(Right) The M18 was powered by a 460 HP Continental R-975-C1 or -C4 nine cylinder, four cycle, gasoline-powered radial engine. This air-cooled powerplant was essentially the same engine used in the M4 and M4A1 tanks and gave the M18 an excellent power-to-weight ratio. It resulted in the M18 being the fastest American Armored Fighting Vehicle (AFV) of World War Two. (Mullins)



(Above) Exhaust manifold pipes surround the outside of the R-975 engine, while two carburetor intakes are located at the bottom. The fuel pump is mounted above the carburetor intakes, while the two magnetos flank the square plate in the center. The starter motor above this square is started by the magnetos and this motor, in turn, starts the engine. The R-975-C4 had a dry weight of 1212 pounds (549.8 kg).

Engine Data Continental R-975-C4

Cylinders:.....Nine
 Type:.....Air-Cooled Radial
 Ignition:.....Magneto
 Maximum Gross Horsepower: 460 HP
 Displacement:.....973 cubic inches (15,944.6 cm³)
 Dry Weight:.....1212 pounds (549.8 kg)
 Fuel:.....80-octane gasoline
 Fuel Capacity:.....165 gallons (624.6 L)
 Engine Oil Capacity:.....36 quarts (34.1 L)
 Transmission:.....Torqmatic – Three speeds forward,
 one speed reverse

(Left) The engine front is surrounded by a large shroud holding the cooling fan assembly. Use of air cooling eliminated the need for radiators and their associated systems, which reduced the vehicle's weight and complexity. The flange in the center of the fan is the clutch, which connected to a drive shaft. This shaft ran from the clutch to the four-speed transmission mounted in the forward hull. Either driver could change speeds in the torqmatic transmission. The nine cylinders had a total displacement of 973 cubic inches (15,944.6 cm³).



The M18's gun mantlet was 0.75 inches (1.9 cm) thick. The gunner's sight was on the port side and was protected by a hinged armor shield. Large lift rings were welded on either side of the mantlet to help remove the 76mm gun for repair or replacement. (Phillips)

The mantlet was normally covered with a canvas dust guard. Its absence in the field – especially in combat – was rare. This cover has a small cutout for the gun sight flap. The cover was colored in a shade close to the vehicle's Olive Drab scheme. (Ward)



The mantlet's starboard side was similar except for the gun sight and its cover. Additionally, the mantlet did not extend as far over to the right. The 76mm M1 gun was offset to starboard of the turret's centerline. The drivers' foul weather hood stowage bins are mounted on the turret sides. (Phillips)

The canvas cover was made of various sections of sewn canvas. It was fastened to the turret using bolted metal strips on the side and top and to the gun using a strap wrapped around the barrel. (Ward)





Early production M18s were not fitted with a muzzle brake. Later models were eventually equipped with a threaded barrel to allow the addition of a double baffle muzzle brake. The muzzle brake reduced the amount of dust and smoke thrown up by the main gun's firing. This debris reduced the vehicle crew's visibility and their ability to acquire new targets. (Ward)

The periscope cover was just forward of the lip of the turret. The gunner was normally provided with an M4A1 periscope, which was used to sight targets from within the safety of the turret.

Sheet metal stowage bins for the drivers' foul weather hoods were welded to both sides of the turret. In the field, these bins were more often used to stow items the crew deemed to be of greater use. The bins did not have any covers, which meant that equipment could be placed in or taken out with ease. (Ward)

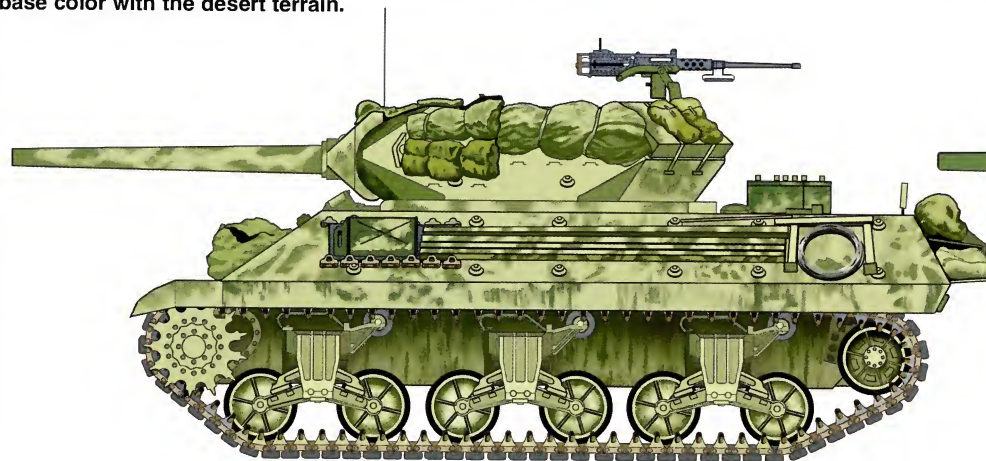


Two grab rails were mounted over the turret's front roof. The gunner's periscope cover is located immediately under the starboard grab rail. Further aft in the turret are the .50 caliber (12.7mm) machine gun in the port side and the radio antenna mounted on the right rear corner.

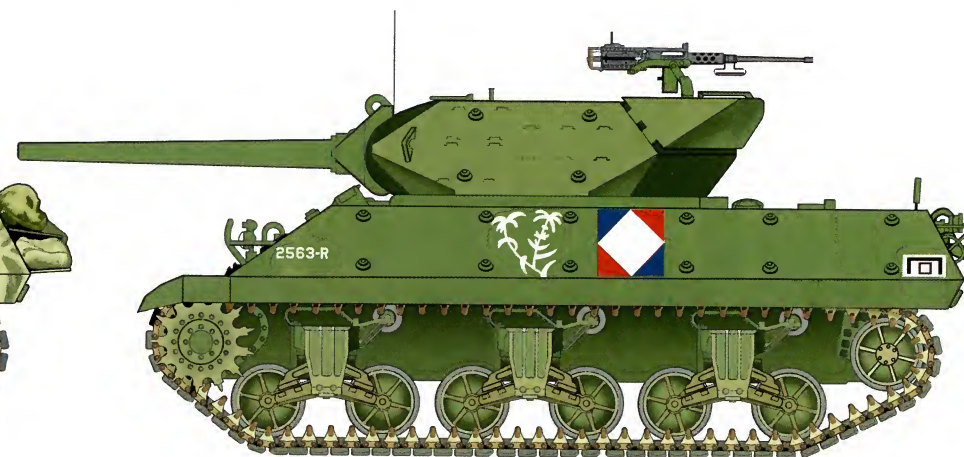
A bulge for the .50 caliber machine gun mount was fitted into the turret's port side. The upper portion of the gun ring was bolted to the flange, which was welded to the cast portion of the bulge. A canvas equipment bag is fastened to a rail mounted on the turret side just below the bulge.



This early production M10 from the 776th Tank Destroyer Battalion (TD Btn.) is fitted with the quick fix counterweights on the turret rear while serving in North Africa in early 1943. The vehicle was given a coat of mud to help blend its Olive Drab (FS34087) base color with the desert terrain.



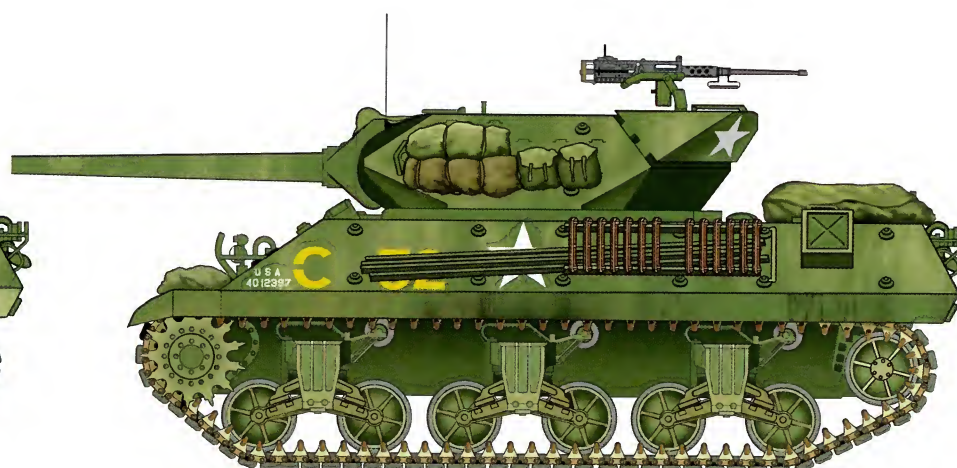
M10s of the 3^e Escadron, 7^e Regiment de Chasseurs D' Afrique served in Italy in 1943. This M10 (2563-R) was assigned to the 2nd Platoon and has a white flower painted on the hull side along with the red and blue markings of the French 5th Armored Division.



This M10 (A21) is from the 823rd TD Btn. near St. Jean-de-Daye, France. It was assigned to support the 30th Infantry Division during the summer fighting and breakout from the Normandy Beachhead in 1944.



A 628th TD Btn. M10 (C32/4012397) was attached to the 5th Armored Division in France in late August of 1944.





A welded tube stowage rack was attached to both sides of the turret. Most rack sections were simply welded to the turret, but the last section was welded to a plate that was bolted to the turret's rear mounted stowage bin.

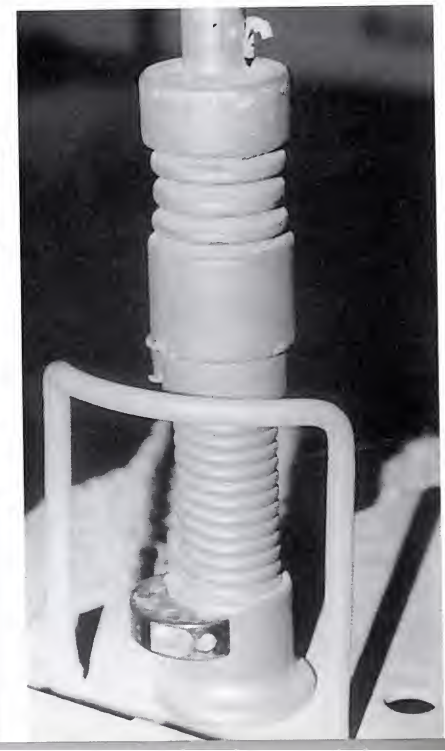
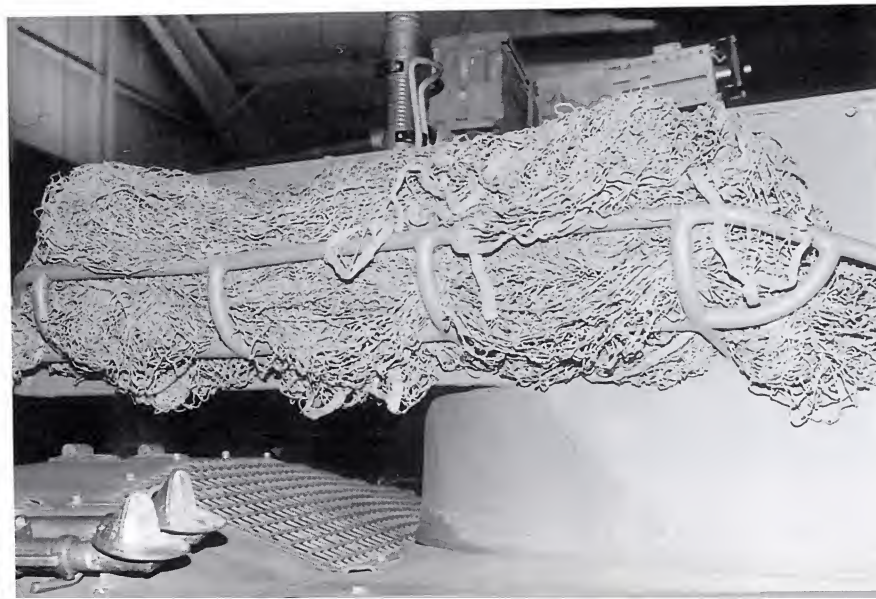
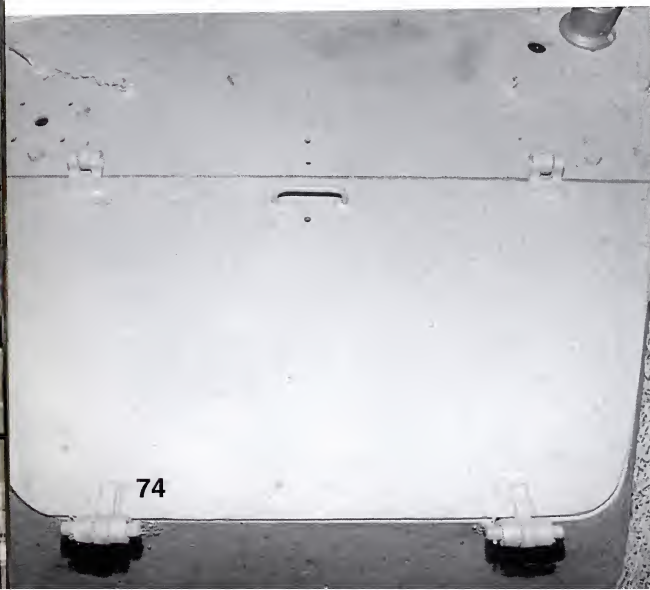


The rearmost portion of the turret was a stowage bin attached to the turret bustle. Extra track links were stored in the rack arrayed across the turret rear. A track holder is attached at the bottom, while another is fitted at the top below the hinges to help hold the extra track in place. This particular M18 was recovered from Bosnia and is in line for restoration at the Patton Armor Museum at Fort Knox, Kentucky. (Ward)

The stowage bin was hinged at the rear to allow crewmembers in the turret to access the contents. Pins – or padlocks – could be inserted in the front to keep the lid closed. This lid was opened using a grab handle mounted near the forward edge. (Ward)

(Below) The turret's starboard side was similar to the port side, except for the machine gun ring bulge. The turret sides incorporated both foul weather hood stowage bins and the welded tube rack. These external racks were necessary due to the M18's cramped interior. (Ward)

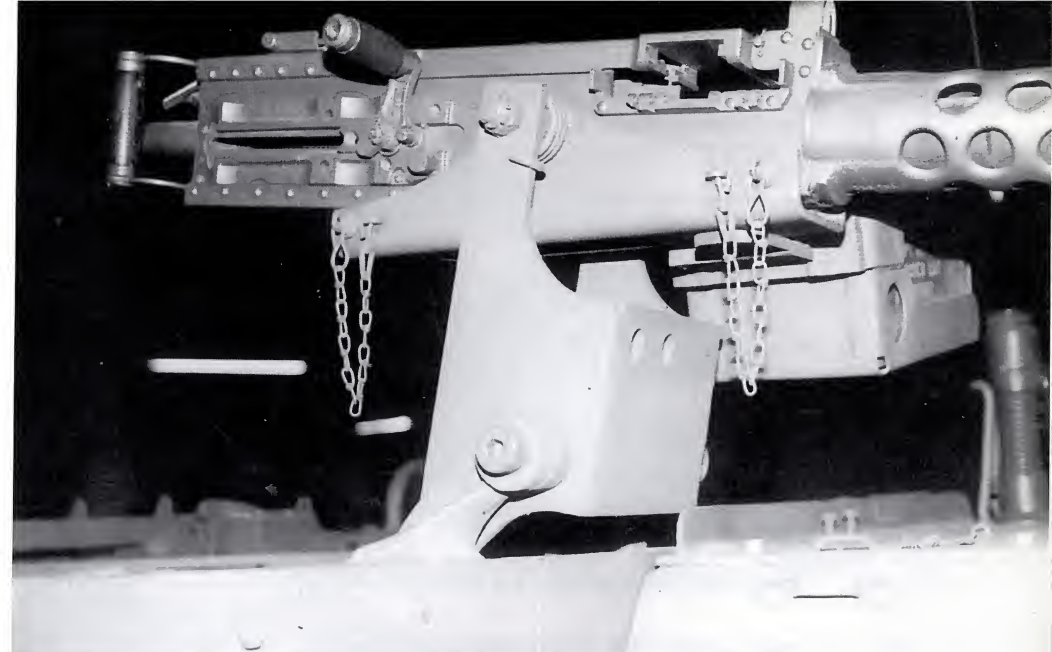
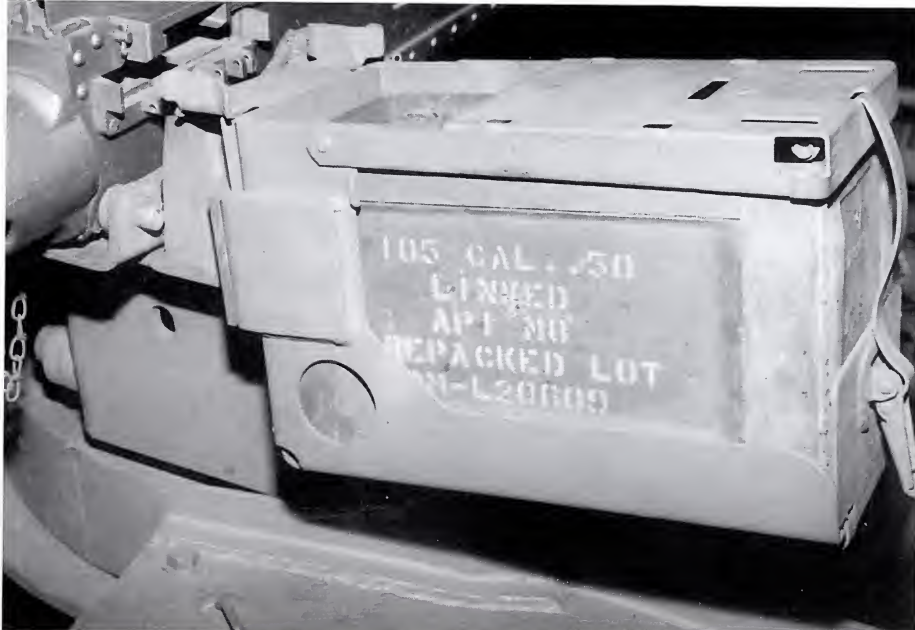
(Right) An SCR 610 radio antenna mount was located on the starboard side of the turret rear. A small guard was welded around the front of the antenna base to reduce the risk of damage. (Ward)





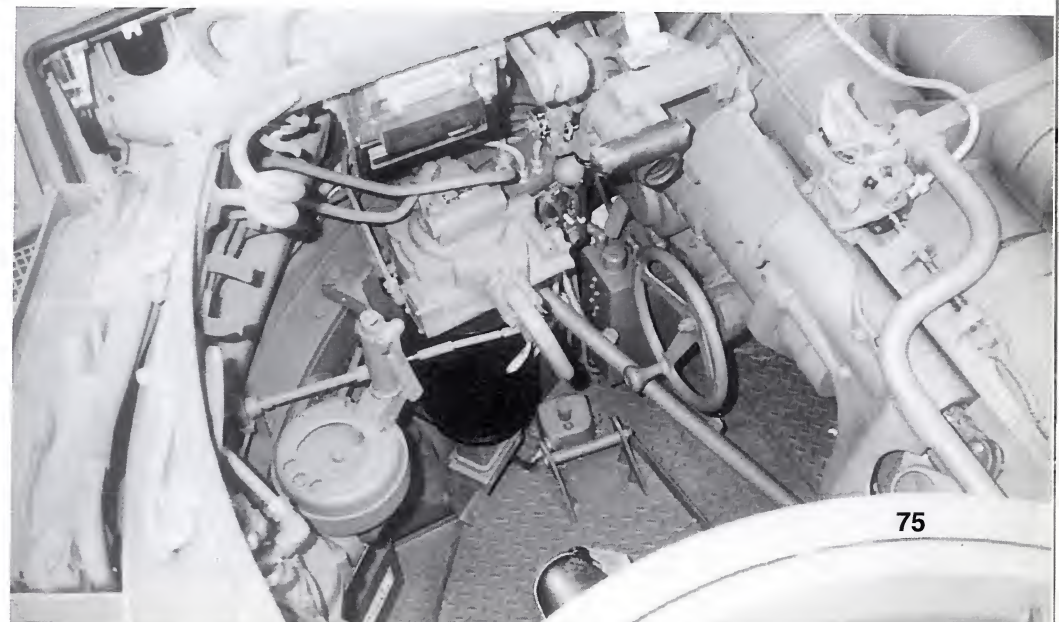
The M18 was the only US tank destroyer with a ring mounted .50 caliber machine gun. This mount was fitted to the port side of the turret and provided the crew with a full 360° arc of fire. The cradle was held stationary by a small pin that could be released to allow it to swing free. This pin was located next to the ammunition tray. The triangular shaped blocks are cushions to provide protection and stability for the operator when the ring was traversed. The SCR 610 radio is mounted in the turret bustle. (Mullins)

The ammunition box was held in a bracket attached to the machine gun cradle. It was secured by a clip on the side that held a swinging cover in place over the top of the open ammunition box. Each box held 105 rounds; the M18 had a total capacity of 800 rounds of .50 caliber ammunition. (Ward)

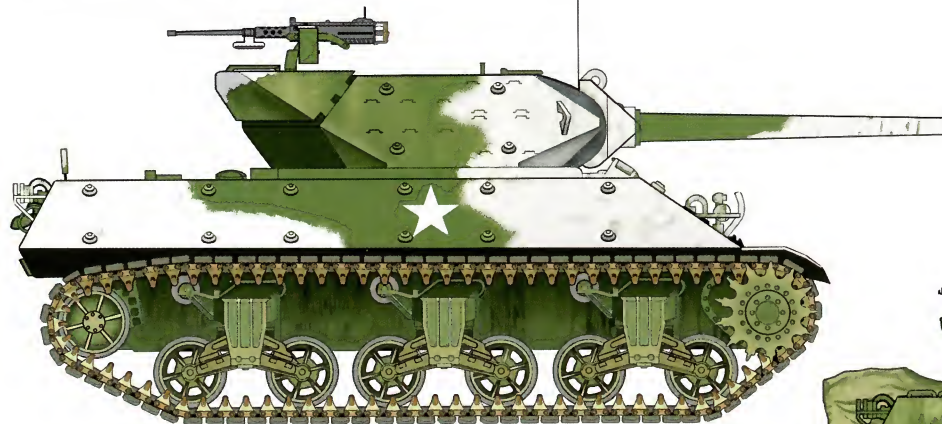


The machine gun mount was bolted to a set of supports welded to the ring. There were bolts at both the top and bottom of the support on both sides. This machine gun cradle was held in place by bolts on either side of the mount. The weapon was secured in the cradle by pins in the receiver housing just behind the cooling jacket and under the cocking handle. (Ward)

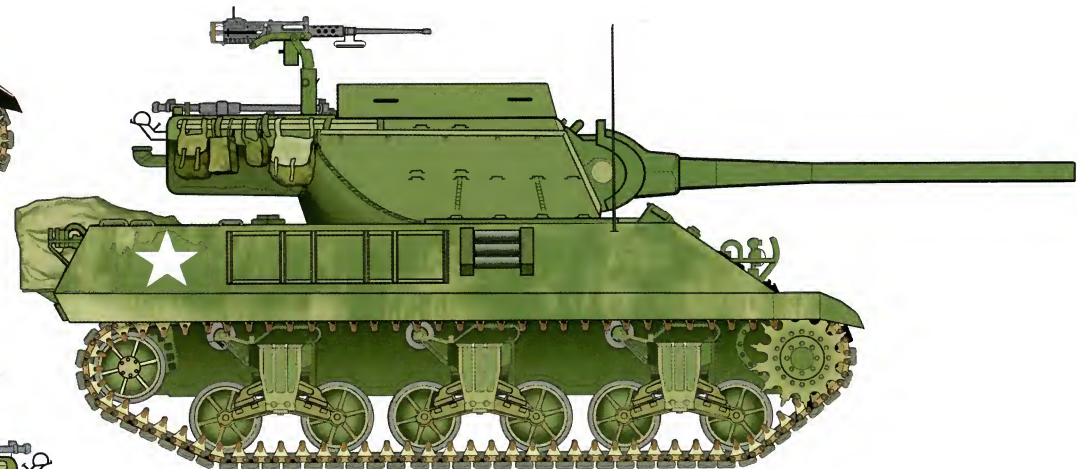
The gunner sat in the port side in the turret. An elevation hand wheel on the left side of the 76MM gun provided -10° through +20° of elevation. The small grip to port of the wheel was the hydraulic (power) traverse control handle. The round device with the handle to its right was the manual traverse control. The gunner's telescopic sight is just above the elevation hand wheel, while his periscope is above the hydraulic control. (Mullins)



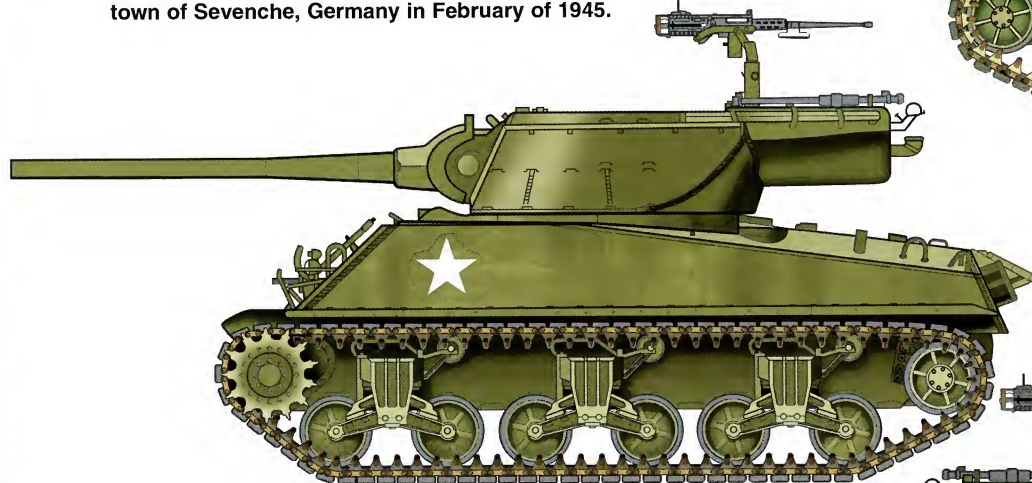
An unidentified M10 was camouflaged in white bands over its Olive Drab base during a fire support mission near Mount Belvedere, Italy in February of 1945. The tank destroyer battalion was assigned to the 5th Army.



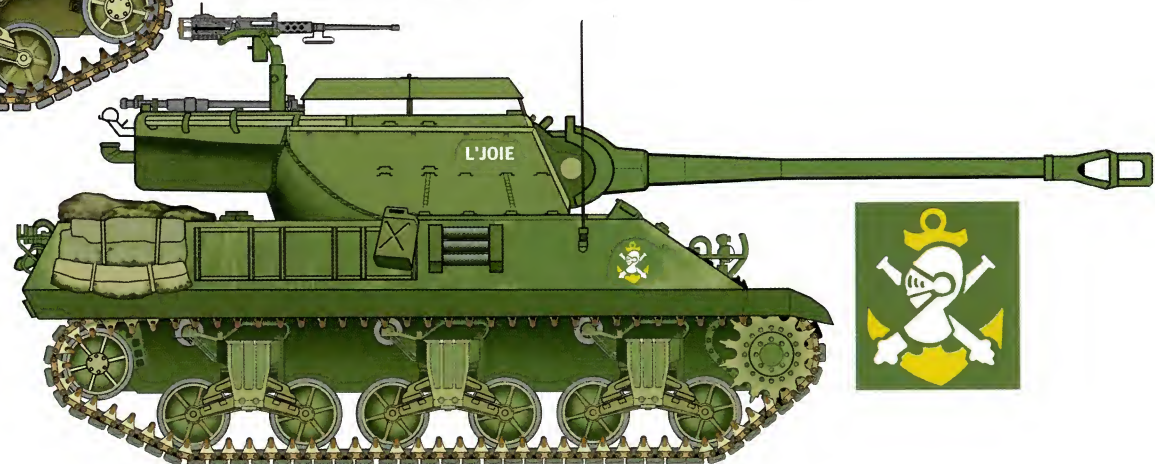
This M36 served with the 628th TD Btn. at Tangermunde, Germany in April of 1945. It was assigned to support the US 5th Armored Division.



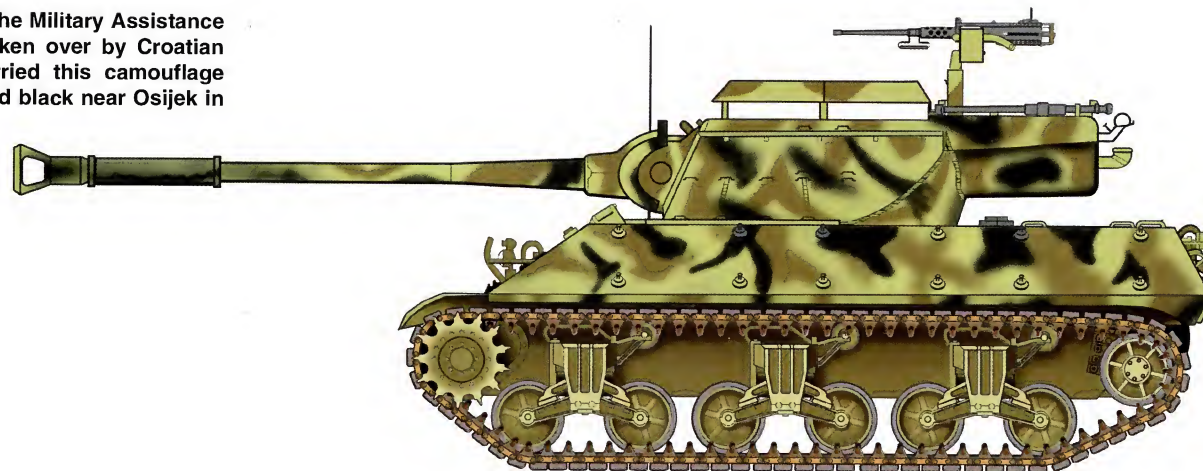
This M36B1 was assigned to the 605th TD Btn. The Battalion was attached to the 102nd Infantry Division during an attack near the town of Sevenche, Germany in February of 1945.



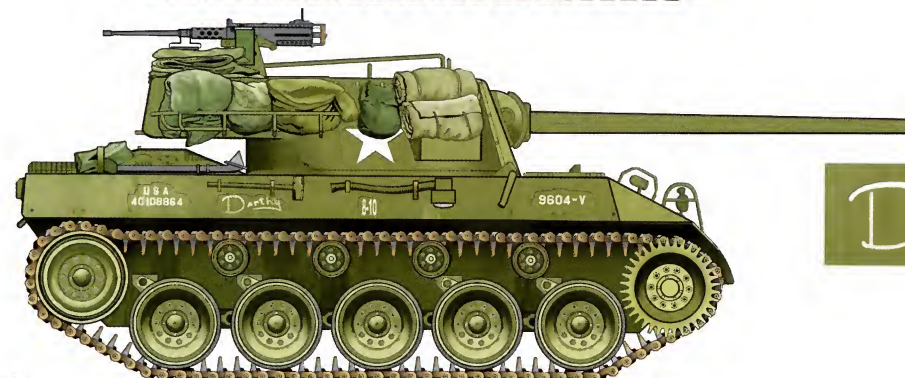
This M36B2 (L'JOIE) is from the *Régiment Blindé Colonial d'Extrême Orient* (RBCEO) in northern Vietnam (Tonkin) in 1952-1953. French M36s were brought to Indochina to counter Red Chinese tanks – a threat which never materialized. The vehicles were eventually used like standard tanks in support of infantry units against the Viet Minh.



This M36B2 was originally supplied under the Military Assistance Program (MAP) to Yugoslavia, but was taken over by Croatian forces when Yugoslavia broke up. It carried this camouflage scheme of dark green, sand, red brown, and black near Osijek in 1991 .

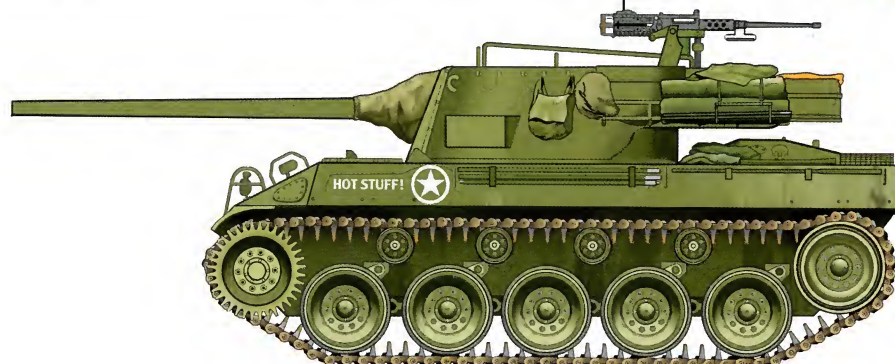


Darthy (40108864/8-10/9604-V) was an M18 assigned to the 827th TD Btn. at Saareburg, France in December of 1944. This unit – one of two African-American tank destroyer battalions in Europe – was attached to the 12th Armored Division.

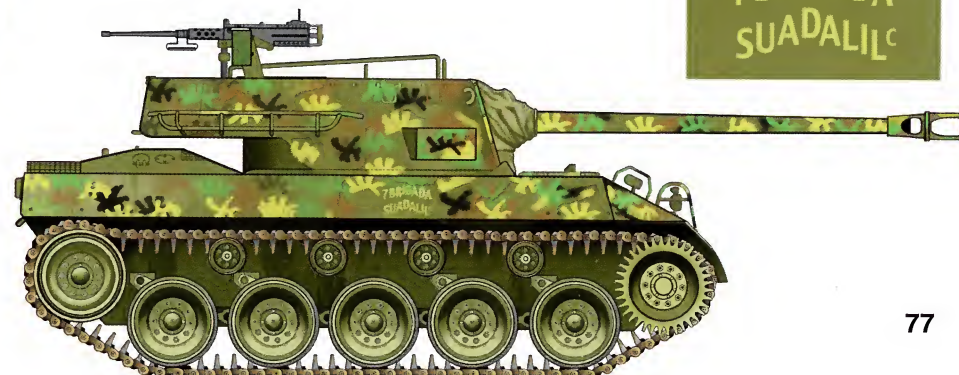


Darthy

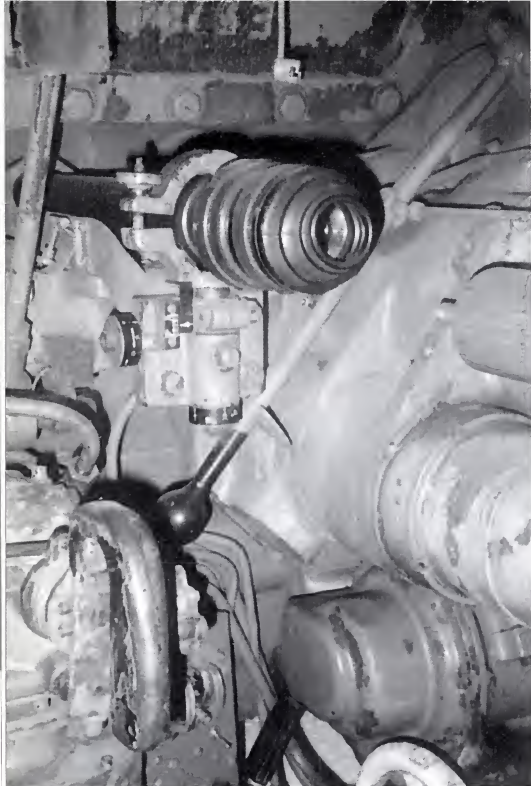
An M18 (HOT STUFF!) from the 602nd TD Btn. engaged enemy forces in the German town of St. Goer, in March of 1945. This Battalion was operating in support of the 89th Infantry Division.



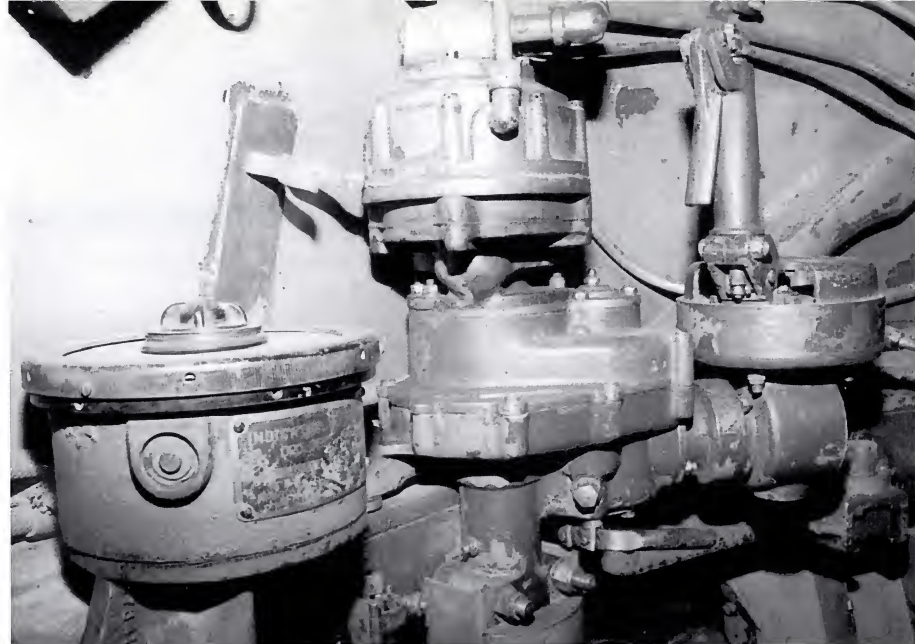
This M18 is from the 7th Brigade of the Serbian Army in the early 1990s. The vehicle was supplied under MAP and was painted in an unusual camouflage scheme of Olive Drab with Black, Red Brown, Light Green, and Earth Yellow patterns in random fashion.



7BRIGADA
SUADALIC

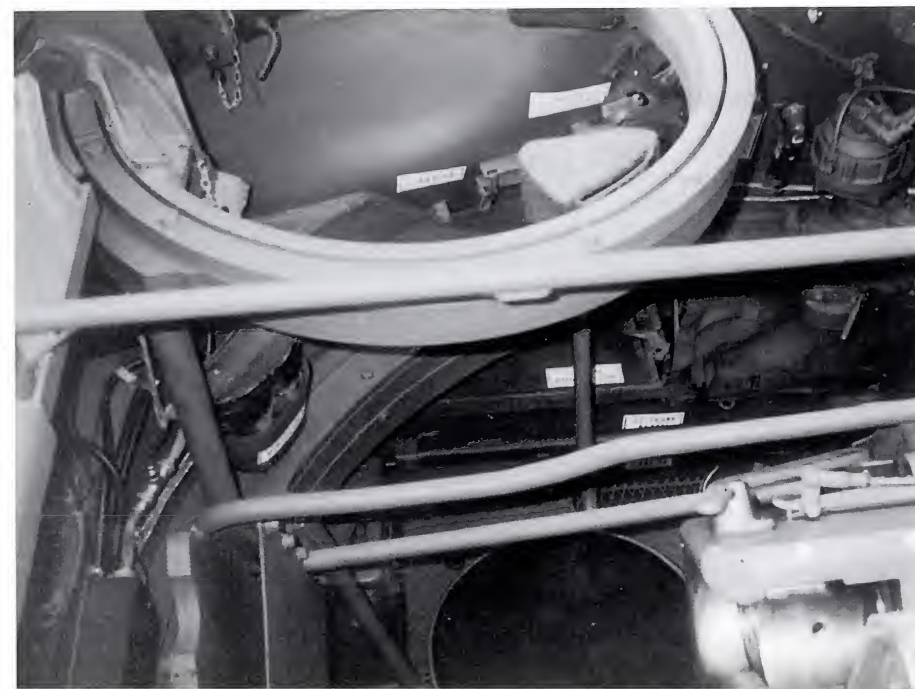


The gunner's sight was mounted beside the 76MM gun. This item was used for direct fire missions, including anti-tank attacks. A manual firing lever – the angled rod with the ball on its end – is located immediately below this sight. The pistol grip device next to the firing lever is the hydraulic traverse control handle. Turning this handle traversed the turret to either port or starboard. The M18's 76MM M1 gun had a maximum firing rate of 20 rounds per minute.

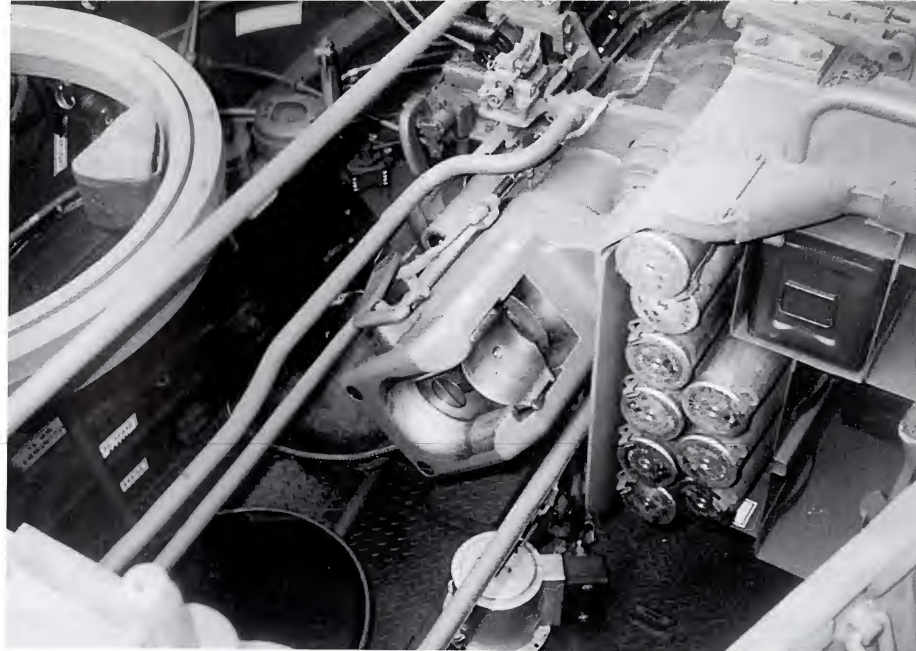


The area to port of the gunner included (left to right) the M20 azimuth indicator, the hydraulic turret traverse motor, and the manual traverse handle. The latter item was used in the event of hydraulic system failure. The M18's turret ring was 69 inches (175.3 cm) in diameter. (Ward)

The M20 azimuth indicator used for indirect fire control normally had a protective wire screen mounted over the top. This indicator gave the gunner direction for locating or reporting a target. (Ward)



The commander's seat was mounted behind the gunner and was supported on two metal tubes hanging from the turret ring. The radio was located in the turret bustle behind the machine gun ring. (Mullins)



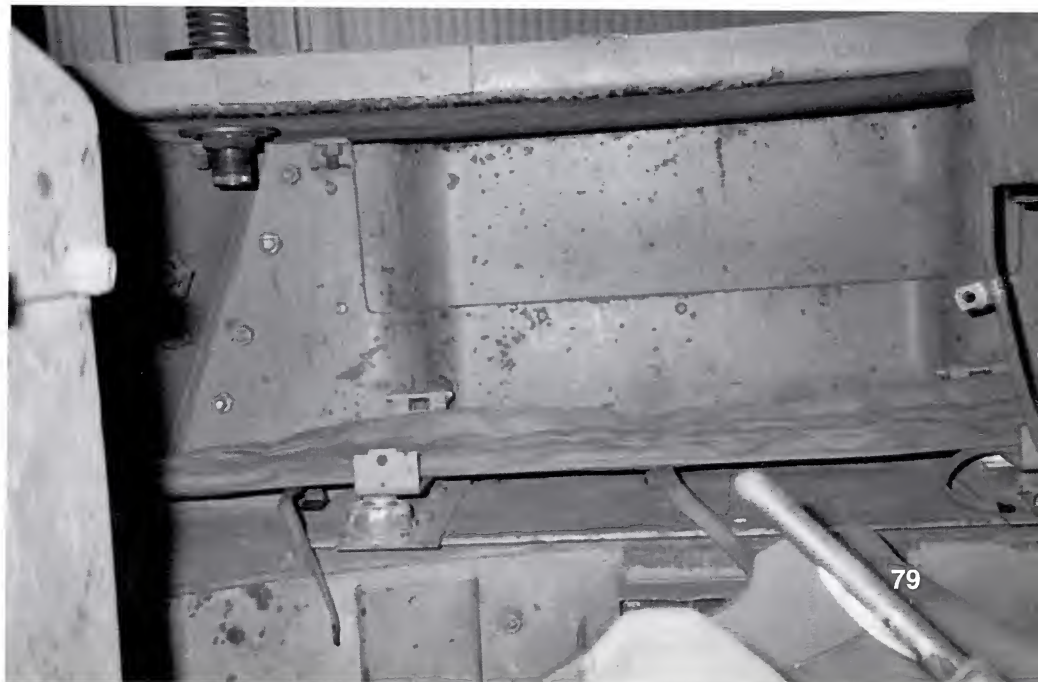
The loader sat to the right of the 76mm gun. A nine-round ammunition ready rack was mounted directly in front of the loader. Production M18s had the 76mm M1 gun offset to starboard to allow it to fit in the turret without a bulge on the port turret wall. The M18 held 45 rounds of ammunition, including nine in the ready rack and the remainder stored in the sponsons and floor. (Mullins)

The sheet metal ready rack had positions for six boxes of .50 caliber ammunition. Four boxes were held in the bottom two slots to starboard, while the other two boxes were placed into the upper spaces. The round device with the triangular notch was a locking device to keep the boxes from sliding out. (Ward)



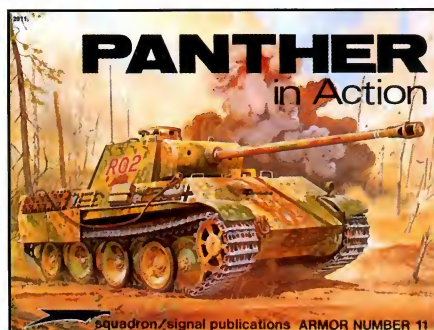
The loader's seat was attached directly to the turret ring. A canteen hangs from a rack immediately to port of this seat. The ready rack also held 105-round .50 caliber machine gun ammunition boxes along with the nine 76mm rounds. (Mullins)

The hollow turret bustle was used to mount the SCR 610 radio system. This radio would be mounted on the port side of the bustle with a battery to starboard. The antenna base protrudes downward from the bustle roof.



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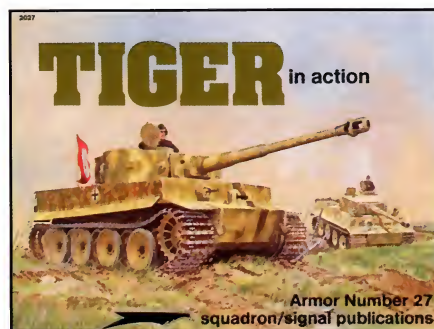
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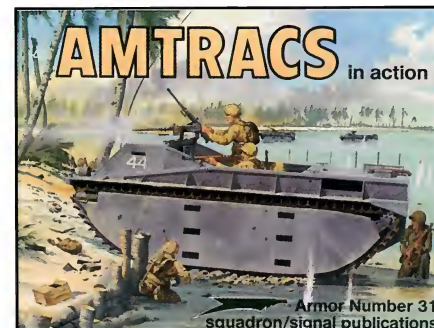
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